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## **EXECUTIVE SUMMARY**

### **I. Introduction**

The filing of this plan marks the beginning of a new chapter in the evolution of Massachusetts Electric Company's efficiency programs. As the Department has provided direction to utility companies throughout the restructuring process, it has proposed to let the market deliver those efficiency services that the market could immediately and profitably provide and continue electric distribution company involvement in efficiency services to those market niches that can not yet be served by the unregulated market and for those activities where concerted and sustained action by utilities and other partners could transform markets towards efficiency. Massachusetts Electric finds that this transition, while profound conceptually, can in many cases be achieved within the context of the mix of programs and services that the Company offers today. In this plan the Company proposes to build upon its established, recognized, and respected programmatic foundation, refining the goals and focus of these efforts where appropriate to meet the explicit objectives outlined by the Department of Public Utilities. This sort of evolutionary transaction allows us to build upon our important established and trusted relationships with customers, and also avoids creating the confusion in the marketplace that inevitably accompanies abrupt change.

For example, with regard to commercial and industrial customers Meco's Energy Initiative resource acquisition program has always achieved ancillary market transformation benefits (as in the case of the commercial market for electronic ballasts and efficient lighting). Thus, when market transformation emerges as the principal corporate objective, a targeted and refined EI program remains an appropriate programmatic engine to achieve it.

For residential customers, the Company is proposing a series of program changes to better respond to changing market conditions and to facilitate coordination and joint program implementation with other regional utilities. In the short term, shifting the focus to market transformation and low income services will lower the cost effectiveness of these programs from a traditional evaluation perspective. In the longer term, market changes should result in greater overall energy savings than the traditional residential programs. These changes would take place within the four program initiative categories which were approved by the Department for 1997.

While we propose evolutionary change, we do see one key difference between the passing era of resource acquisition of efficiency and the coming one of market transformation: successful market transformation will require cooperation amongst all the entities who service the target economic market. In our region, efficiency markets encompass at least Massachusetts and in most cases all of New England. Thus we look forward to continuing to work with the other electric distribution companies in Massachusetts and beyond, as well as with other public and private entities to craft cooperative or complementary initiatives to achieve sustained market transformation in Massachusetts and the region. Through mutual collaboration and cooperation, it will be possible for us all to achieve the efficiency goals set by the MDPU and other commissions in neighboring jurisdictions.

The Massachusetts Electric Company is proud of its energy efficiency programs and its recognized record of achievement in this area. We are confident that we can continue to achieve the same level of success in the future meeting society's new objectives for energy efficiency.

## **II. Overview**

This filing is intended to satisfy similar regulatory instructions found in two orders of the Massachusetts Department of Public Utilities. In 96-100, the Electric Industry Restructuring Plan: Model Rules and Legislative Proposal, the DPU instructed each distribution company to file a five-year energy efficiency plan. In 96-25, Massachusetts Electric's Amended Offer of Settlement, the Company agreed to file annual budgets for demand-side management (DSM) programs and clean renewables for the period 1998 through 2001 on July 1, 1997<sup>1</sup>.

### **A. Justification for Energy Efficiency Efforts**

In the May 1 Statement (pages 64-66) and in D.P.U. 96-100 (Model Rules and Legislative Proposal, pages 182-183), the Department set forth two primary justifications for public intervention to support energy efficiency:

- Some of the market barriers to energy efficiency that currently exist are likely to continue even after a competitive market has developed, and publicly-funded programs are one method of mitigating the effects of these barriers (thereby providing justification for market transformation initiatives, market-driven programs, retrofit and other efforts, and low-income programs).

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<sup>1</sup>Throughout this report, the phrase "energy efficiency" is used in place of demand-side management.

- Continuing to support and encourage the development of the energy efficiency industry in Massachusetts is in the public interest.

The Department also noted (D.P.U. 96-100, page 183) that “energy efficiency provides the opportunity for customers to lower their electric bills, enhances customer choice, lowers the environmental impact of providing electric service, and furthers important Department, state, and national energy objectives. These objectives are delineated in D.P.U. 95-30.

The nature and level of future public funding for energy efficiency efforts should be determined based on the response of the competitive market in providing energy efficiency services, the nature and magnitude of the remaining market barriers to cost-effective energy efficiency, the opportunities for eliminating or reducing the remaining market barriers to energy efficiency, the potential for future market transformation, and the progress of energy efficiency efforts to date.

## **B. Types of Energy Efficiency Efforts**

At least four categories of energy efficiency efforts are likely to exist in the new industry environment:

- Public purpose wires charge (rate component) energy efficiency activities
  - Education programs
  - Market transformation initiatives
  - Market-driven/lost opportunity programs
  - Retrofit and other programs
  - Low income efficiency programs
- Least-cost distribution system investments
- Lease-cost transmission system investments
- Market-based energy efficiency
  - ESCOs, suppliers, aggregators, power marketing companies, retail services suppliers
  - Fee-for-service offerings of distribution utilities (unregulated or regulated)

By definition, the first category requires publicly-funded intervention (using distribution access charges), the second and third categories require ratepayer funding (to support the distribution or transmission system investments), and the fourth category (market-based efforts) could benefit from enhanced strategic public support, including ongoing coordination with the publicly-funded efforts.

### **C. Public Purpose Programs: Definitions and Strategic Objectives**

There are five types of public purpose programs that are appropriate to fund through distribution utility access charges:

- Education. Educational efforts to support energy efficiency programs are encouraged when providing information, data, analysis and training are important to influence customer or trade ally knowledge and decision-making. Therefore, adequate educational elements should be integrated into most energy efficiency programs. A program based on education alone is only efficacious when the lack of such material is the only barrier to market accessibility for energy efficiency measures or practices and market transformation can be expected as a result. There are very few instances where this condition exists.
- Market transformation initiatives. Market transformation initiatives are strategic efforts by utilities and other organizations to induce lasting changes in the structure, function, or behavior of the market that result in increases in the adoption of energy efficient products, services, and/or practices.<sup>2</sup> Often these initiatives are intended to reduce or eliminate market barriers to energy efficiency in a lasting manner, to the point where public intervention in the market is no longer justified, or the nature or level of intervention can be changed.<sup>3</sup>
- Market driven/lost opportunity investments. These programs capture energy efficiency opportunities at the time of a naturally-occurring market event, such as new construction, expansion, renovation, remodeling, and equipment replacement. The programs are designed to minimize lost opportunities in the market. Efficiency investments are generally available at full or fractional incremental cost rather than full installation cost.

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<sup>2</sup>Definition adopted from Stipulation of the Parties, in re: Narragansett Electric Company 19976 Conservation and Load Management Adjustment Provisions, State of Rhode Island and Providence Plantations Public Utilities Commission, Docket No. 1939, Attachment 11, pp. 3-4; and from definitions developed by Jeff Schlegel and Ken Keating. The D.P.U. Model Rules (page 184) define market transformation initiatives as "strategic efforts to offset market failures and to induce lasting changes that result in increases in the adoption or penetration of energy efficient technologies or practices."

<sup>3</sup>Using Performance Incentives to Encourage Distribution Utility Support of Market Transformation Initiatives, Jeff Schlegel and Fred Gordon, Proceedings of the ACEEE 1996 Summer Study on Energy Efficiency in Buildings, 1996, p. 7.167.



- Retrofit and other programs. As part of this plan, the Company proposes to continue a number of its successful retrofit or resource acquisition programs for a variety of reasons. Traditionally, these measures seek to: 1) exchange functioning but inefficient equipment within residential, commercial, or industrial settings with higher efficiency equipment; 2) to improve building shell or facility performance; 3) to improve energy use or management practices; and 4) to induce efficiency where it was not previously present (e.g., by adding insulation).

There are cost-effective energy-efficiency opportunities available in many markets and customer segments for which continued deployment of specific retrofit programs is still necessary and warranted. Public intervention through retrofit strategies is justified to:

- a) Serve as a strategic element of a market transformation strategy (e.g. introducing a new technology into the marketplace in order to test, pilot and familiarize customers and trade allies, gain market acceptance and increase market share, etc., for the new technology, measure or practice);
- b) Overcome market barriers to cost-effective energy efficiency that are too intractable or expensive to reduce or eliminate (e.g., financial cost, split incentives in rental property, etc.);
- c) Secure cost-effective benefits that the competitive market is unlikely to provide (e.g., where markets or average customers are too small, or the energy savings opportunities too diffuse, to interest private efficiency services providers; typically, general residential, low income, small commercial, distressed industries, etc.);
- d) Address issues of equity regarding customer access to efficiency opportunities;
- e) To maintain an experienced energy-efficiency business infrastructure that competitively delivers design, energy use studies, installations (including commissioning and O&M), inspections, evaluations and other technical services to utilities and their customer through the transition to a competitive, restructured electric utility industry;
- f) To complement and enhance market-based delivery of energy-efficiency services;
- g) To address specific economic development objectives (e.g., as an element of a program to assist troubled industries, to

maintain or increase the job base, to assist in business expansion, etc.);

- h) To fulfill other specific public purposes (e.g., low income programs);
- i) To mitigate the risks and costs of power outages due to emergency or unplanned conditions leading to supply shortfalls; and
- j) To facilitate and leverage least-cost investment by distribution utilities in targeting DSM, to avoid or defer more costly system upgrades.

- Low income efficiency services. Low income efficiency services are comprehensive programs designed to ensure that energy bills are affordable for low income customers. The programs include education, case management, weatherization and energy efficiency installations, rate discounts, and arrearage reduction and payment behavior components.

#### **D. Components of Five-Year Plan**

MDPU 96-100 requested that the five year energy efficiency plan include the following components:

1. An educational component that seeks to ensure that customers have adequate information about energy efficiency for informed decision-making;
2. A proposal for support of regional or national energy efficiency market transformation initiatives to the extent that they can provide benefits to the Company's customers;
3. A description of the evolution of the company's DSM programs to market-driven efforts during the years covered by the plans;
4. A description of the evaluation criteria appropriate to the energy efficiency measures and market transformation initiatives included in the Company's energy efficiency plan;
5. A proposal for the Company to coordinate delivery of energy efficiency services to low-income customers with the local weatherization assistance program agencies or other appropriate community action agencies that serve the low-income population in the Company's service territory; and
6. A proposed budget and incentives to support the activities listed above.

With regard to component #6, the Company's Offer of Settlement in DPU 96-25 established an annual budget for energy efficiency programs and

clean renewables of \$66.7 million. Of this \$66.7 million, funds are to be allocated to commercialize and develop fuel cells and a diverse group of clean renewables based on the following rates per kilowatt hours times the kilowatt hours distributed by MECo. In 1998 the rate will be \$0.00025; in 1999, \$0.00055; in 2000, \$0.00085; in 2001, \$0.00125 and in 2002, \$0.00125.<sup>4</sup> The remaining budget for energy efficiency and other components associated with the settlement are \$62.5 million in 1998, \$57.4 million in 1999, \$52.2 million in 2000, \$45.2 million in 2001, and \$45.1 million in 2002. These budgets include all costs for MECo's energy conservation service (ECS) program, interruptible rate credits, Mass. Electric's energy efficiency programs, program evaluation, installation of sophisticated metering and control systems, and the incentive or bonus earned from programs implemented prior to the Retail Access Date and to be earned on the energy efficiency programs implemented after the Retail Access Date. A discussion of the budget is presented in Chapter 8.

This Five Year Energy Efficiency Plan is filed to satisfy reporting requirements for both Massachusetts Electric Company and Nantucket Electric Company. Customers on Nantucket are eligible for the full range of energy efficiency programs described in this plan. However, there may be some difference in the way programs are administered or delivered to address special conditions specific to Nantucket Island. Throughout this document, the phrases "The Company", "Massachusetts Electric", "Mass Electric", and "MECo" are used interchangeably, and in all cases, reflect services available to customers of both companies.

In this plan, the Company proposes a broad range of initiatives to address components 1, 2, 3 and 5 in DPU 96-100 along with the concomitant evaluation criteria and budgets. These initiatives, budgets and evaluation criteria are described briefly below:

- 1. An educational component that seeks to ensure that customers have adequate information about energy efficiency for informed decision-making;**

All residential initiatives contain a strong educational focus. Several residential programs provide individual technical assistance to customers who have a special opportunity to save energy because they are buying a new home, lighting or appliances, or have higher than average electric usage. The programs will provide customer

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<sup>4</sup>The Company's Offer of Settlement covers 1998 through 2001. In this Plan, the Company has included a placeholder rate per kilowatt hour for renewables of \$0.00125 for 2002.

information and education through advertising, energy efficiency literature, and phone and in-home counseling. More than \$3 million is targeted for educational advertising, which includes introducing ENERGY STAR®, the national energy efficiency trademark of the federal Department of Energy and Environmental Protection agencies. The ENERGY STAR® trademark will identify efficient home appliances, mortgages, home energy ratings, and lighting. These efforts will reinforce national and regional market transformation initiatives described in more detail in Chapter 3.

With regard to commercial/industrial customers, the Company has learned through experience that the most effective strategy for educating customers about energy efficiency is to combine educational services such as technical assistance and commissioning with financial rebates and other technical services that address immediate and tangible customer needs. In today's world, facility and energy engineers and corporate decision-makers are frequently overwhelmed with general information and have little time to read and digest it. In this environment, MECo believes that efficiency information is more likely to receive notice and attention when it is packaged with customized services that go directly to customer needs. Thus, the Company proposes to continue to enhance the efficiency services that it currently offers to customers and to offer new technical services to enable customers to receive technical information that is most useful to them and applicable to their particular operations. Existing services such as technical assistance, commissioning, Chiller Initiative and the Comprehensive Design Approach are four prime examples of services that are designed to educate customers (Chapter 2). New proposed services such as operations and maintenance and the industrial optimization services are two additional educational services the Company plans to offer in 1998.

**2. A proposal for support of regional or national energy efficiency market transformation initiatives to the extent that they can provide benefits to the Company's customers;**

The Company is an active participant in initiatives sponsored by the Northeast Energy Efficiency Partnerships (NEEP), the Consortium for Energy Efficiency (CEE), the DOE/EPA ENERGY STAR® programs, and participates in several Massachusetts utility working groups. (NEEP supports the development and implementation of regional market transformation programs, CEE does the same on a national basis.) For residential customers, these initiatives include efforts to

promote high-efficiency residential luminaires, clothes washers, apartment-sized refrigerators, other appliances, and new homes. For commercial/industrial customers, the Company is participating in initiatives that support high efficiency motors and unitary HVAC. MECo is also considering supporting a Torchiere Initiative to replace high energy consumption halogen torchiere lamps with high efficiency alternatives. These initiatives are described in Chapter 2, Section V.A. and B.

In addition, the Company's core C/I energy efficiency programs, Design 2000, Energy Initiative (E.I.) and Small C/I, have historically played a critical role in helping transform markets (see Chapter 2 for examples). The Company plans to continue offering these programs, albeit at declining budgets for E.I. and Small C/I over the five year planning horizon. These programs will serve as the foundation for the Company's market transformation efforts and other new market transformation initiatives as proposed in Chapter 2. The rationale behind treating these programs as market transformation initiatives is also outlined in Chapter 2.

**3. A description of the evolution of the Company's energy efficiency programs to market-driven efforts during the years covered by the plans;**

The evolution of the Company's programs is described in detail, by market and customer type throughout the plan. In summary, the Company plans to decrease spending in the more traditional retrofit programs, while targeting remaining spending in these programs toward products where investment will assist in market transformation. The Company will also greatly increase participation in regional and national collaboratives, and revise program offerings as needed to avoid competition with new energy efficiency services that may be offered by unregulated service providers in the open market.

**4. A description of the evaluation criteria appropriate to the energy efficiency measures and market transformation initiatives included in the Company's plan;**

Traditional impact evaluation methods will be used to measure the impacts of traditional program elements, with added consideration given to impacts on market factors as the programs evolve and assume a more market driven emphasis. The Company expects that the evaluation of regional energy efficiency efforts will be conducted

on a regional basis through joint utility studies and that details on the timing and scope of these regional studies will be determined after regional program designs are finalized. It is likely that the impacts of regional energy efficiency efforts will potentially focus more on changes in regional market factors, such as market saturation of a technology or market availability of emerging products, than on estimating conventional kW and kWh impacts. Educational program components will be evaluated using surveys to assess customer awareness. Process evaluations will be conducted of new or expanded customer services to assess their acceptance by customers and their usefulness in overcoming or reducing market barriers: examples include commissioning, O&M services, and technical assistance.

A more detailed discussion of expected evaluation activities is presented in Chapter 4.

- 5. A proposal for the Company to coordinate delivery of energy efficiency services to low-income customers with the local weatherization assistance program or other appropriate community action agencies that serve the low-income population in the Company's service territory;**

The Company is currently employing all Community Action Program agencies in its service territory to deliver the Appliance Management Program. The Company has offered to license this program to other utilities so that it can be used throughout the state if appropriate. Low-income advocates and all Massachusetts utilities are exploring other service delivery options as well. The Company also has offered to fund electric weatherization for low-income clients .

- 6. A proposed budget to support the activities listed above.**

As previously mentioned, the budget for this five year plan is \$62.5 million in 1998 ramping down to \$45.1 million in 2002. These budgets as shown in Exhibit 8.1 and discussed in Chapter 8 are split between the Residential Energy Efficiency Programs, the Commercial/Industrial Energy Efficiency Programs, and Other Programs including interruptible rate credits, Home Energy Management, metering and control systems, program evaluation and incentives earned from the efficiency programs before and after Retail Access Date. Overhead costs are included in the individual program budgets and are not listed separately. A detailed budget broken down by individual initiatives

and programs is provided for the first two years of the plan Exhibits 8.2 and 8.3 and a preliminary aggregate budget for each major budget components is provided for the last three years of the plan (See Exhibit 8.1). During any given year, the Company shall reconcile actual energy efficiency spending and earned incentive to the approved budget and shall carry forward any balance, positive or negative into the following year through an adjustment to the approved budget.

The Company is proposing a new incentive mechanism for its energy efficiency programs in 1998 and 1999. The proposed after tax incentive target is \$4.0M and includes three components: 1) a maximizing incentive based on lifetime kWh and lifetime kW; 2) an efficiency incentive based on the benefit/cost ratio of the programs and 3) specific performance metrics for some of the Company's new initiatives. The incentive is described in Chapter 1.

#### **Other Sections: Policy Framework, Interruptible Rate Credits, Metering/Controls, Targeted Demand Side Management Programs**

In addition to the above, this filing includes sections on a policy framework for evaluating the cost-effectiveness of energy efficiency programs and for determining an appropriate incentive mechanism, an overview of the Interruptible Rate Credits to be incurred through the year 2000, a proposal for metering and controls and finally, a proposal for targeted demand-side management (TDSM).

### **III. Collaborative Approach**

Over the last six months, the Company has been working with numerous outside parties to gather their input, insight and support for this plan. These parties include: DOER, MDPU staff, representatives of other distribution companies, NEEC, TEC, AIM, CLF and the Attorney General's office. The Company has worked with CEE, NEEP, the MDPU staff, and many of the other distribution companies to ensure consistent regional implementation of market transformation efforts. The Company has worked with the CAPs and other low-income interest groups to develop a strategy for low-income delivery.

### **IV. Organization of the Plan**

The plan is organized in the following manner:

Chapter 1	Policy Framework
Chapter 2	Commerical/Industrial Energy Efficiency Initiatives

Chapter 3	Residential Energy Efficiency Initiatives
Chapter 4	Evaluation
Chapter 5	Metering and Controls
Chapter 6	Interruptible Rates and Home Energy Management
Chapter 7	Targeted Demand Side Management
Chapter 8	Budgets



# POLICY FRAMEWORK

## I. Overview

This section will present a proposed policy framework for energy efficiency for Massachusetts Electric's five-year plan. The framework includes the benefit cost tests that will be used by the Company to analyze its energy efficiency programs and the Company's incentive proposal for 1998 and 1999. The Company is modifying both the Benefit/Cost Analysis it uses and its incentive to reflect the MDPU's new policy directions for energy efficiency in a restructured utility environment.

## II. Benefit/Cost Tests

The Company is proposing to use two benefit/cost tests to analyze its energy efficiency programs in a restructured electric environment. The Company has used a simplified societal test and an electric system test. The simplified societal test is an appropriate measure of cost-effectiveness for programs that are funded by a system benefits charge. The electric system test is also an appropriate metric, as ratepayer funds are being used for this system benefits charge. The individual costs and benefits that are included in both of these tests are shown in Exhibit 1.1.

**Exhibit 1.1**

	<u>Simplified Societal Test</u>	<u>Electric System Test</u>
<b><u>Benefits</u></b>		
Avoided Generation <sup>5</sup>	✓	✓
Avoided Transmission <sup>3</sup>	✓	✓
Avoided Distribution <sup>3</sup>	✓	✓
Savings from Free-riders	✓	
Spillover Market Effects	✓	✓ <sup>6</sup>
Non Quantified Benefits/Other Non Electric Resource Savings	✓	
<b><u>Costs</u></b>		
Program costs	✓	✓
Customer costs	✓	

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<sup>5</sup>See Exhibit 1.2 and 1.3.

<sup>6</sup>Participant Spillover only

Customer costs from Spillover	✓	
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#### **A. The Simplified Societal Test**

The components of the simplified societal test shown in Exhibit 1.1 include electric system benefits (avoided generation, distribution and transmission), which will be discussed in section C. Other benefits used in the societal test include savings from free-riders, market effects and spillover and a 15% adder on kWh savings only for non-quantified benefits. The Company has also made some simplified assumptions about savings of other resources such as water, natural gas and oil in programs where this is appropriate such as the clothes washer initiative. These projections will be enhanced as the regional program designs are finalized. For regional program consistency it will be important for data to be developed on a regional basis. The Company will work with NEEP and CEE to ensure that this happens.

Costs included in the societal test shown here include all distribution utility program costs (implementation administration and evaluation), customer costs associated directly with direct program effects, and customer costs associated with spillover. The Company's incentive is not included in these calculations as it is a cost to rate payers, and a benefit to the Company's shareholders and hence a transfer payment.

#### **B. Electric System Test**

The electric system test shown here in Exhibit 1.1 is very similar to the utility test that was used in the past. Benefits include the avoided electric system benefits (i.e., avoided generation, transmission and distribution). Costs include all of the Company program costs. The test proposed here does include participant spillover as a benefit, consistent with the policy of support for market transformation.

#### **C. Avoided Generation, Transmission and Distribution Costs**

The benefits related to the electric system savings used by the Company and how they are calculated are shown in Exhibit 1.2 and Exhibit 1.3. Exhibit 1.2 shows the calculations used and Exhibit 1.3 presents the sources of the data. The components of the benefits include:

- marginal capacity cost
- marginal energy costs
- marginal distribution system loss factors
- marginal distribution costs
- marginal transmission costs

The marginal distribution system loss factors and marginal distribution costs are derived from the Company's marginal loss study and most recent

marginal distribution cost studies. The energy and capacity values are derived from work done by the Massachusetts Division of Energy Resources (DOER) as part of the Electric Utility Energy Efficiency Technical Forum. DOER's work was done collaboratively with input from all of the distribution companies and other interested parties. The report of the DOER can be found in Appendix A. The marginal transmission values are from New England Power's (NEP) W-95 case.

## Exhibit 1.2

### **BENEFIT COMPONENTS FOR 1998 ENERGY EFFICIENCY PROGRAMS**

1. Marginal Capacity Cost  
(See Exhibit 1.3)

Summer Months (Jun., Jul., Aug., Sept.) \$8.88/kW-month  
Shoulder Months (Mar., Apr., May, Oct., Nov.) \$0.93/kW-month  
Winter Months (Jan., Feb., Dec.) \$8.10/kW-month

2. Marginal Energy Cost  
(See Exhibit 1.3)

On-Peak: \$0.03927  
Off-Peak: \$0.02885

3. Marginal Distribution System Loss Factors

	----- Capacity -----			On Peak	Off Peak
<u>Program</u>	Summer	Winter	Shoulder	Energy	Energy
C&I	1.109	1.092	1.080	1.067	1.033
Residential	1.123	1.103	1.090	1.076	1.038

4. Marginal Distribution Cost

Primary: \$ 50.50 per kW-year  
Secondary: \$107.96 per kW-year

Sources:

Item 1: From DOER proposal (Appendix A) and Company Estimate of Transmission value

- Item 2: From DOER proposal (Appendix A)
- Item 3: Based on NEES 1987 Marginal Loss Study.
- Item 4: Based on Marginal Distribution Cost Study for Massachusetts Electric.  
Inflated to 1998 dollars.

## Exhibit 1.3

### DERIVATION OF COMPANY ENERGY AND CAPACITY VALUES FROM DOER AVOIDED GENERATION COMPONENT VALUES

DOER "avoided generation component" value, 40.10 from DOER memo 6/25/97, Attachment E  
\$/MWh

#### MARGINAL CAPACITY COST

DOER capacity value, \$/kW	36.66	a	from DOER memo 6/25/97, Attachment E
Capacity value, w/losses, \$/kW	38.13	b	a * 1.04, Company peak transmission loss estimate
Summer capacity value allocation percentage	48.3%	c	Company summer month generation capacity allocation <sup>1</sup>
Shoulder capacity value allocation percentage	8.2%	d	Company shoulder month generation capacity allocation <sup>1</sup>
Winter capacity value allocation percentage	43.5%	e	Company winter month generation capacity allocation <sup>1</sup>
Marginal transmission capacity value, \$/kW	25.30	f	From NEP W-95, Statement BL, Schedule 2, page 3 of 4. Transmission capacity value (\$23.15) * 1.03 inflation for three years since 1995
Transmission capacity value w/ losses, \$/kW	26.31	g	f * 1.04, Company peak transmission loss estimate
Summer Trans value allocation percentage	65.0%	h	Company summer month generation capacity allocation <sup>1</sup>
Shoulder Trans value allocation percentage	5.7%	i	Company shoulder month generation capacity allocation <sup>1</sup>
Winter Trans value allocation percentage	29.3%	j	Company winter month generation capacity allocation <sup>1</sup>
Trans. + Gen. capacity value, \$/kW	61.96	k	a + f
Trans. + Gen. capacity value w/losses, \$/kW	64.43	l	b + g
Summer season capacity value, \$/kW	35.52	m	(b * c) + (g * h)
Shoulder season capacity value, \$/kW	4.63	n	(b * d) + (g * i)
Winter season capacity value, \$/kW	24.29	o	(b * e) + (g * j)
<b>Summer month capacity value, \$/kW-month</b>	<b>8.88</b>	p	m/4
<b>Shoulder month capacity value \$/kW-month</b>	<b>0.93</b>	q	n/5
<b>Winter month capacity value, \$/kW-month</b>	<b>8.10</b>	r	o/3

#### MARGINAL ENERGY COST

DOER energy value, \$/MWh	33.32	s	from DOER memo 6/25/97, Attachment E
DOER on peak energy value, \$/MWh	38.13	t	from DOER memo 6/25/97, Attachment F-2
DOER off peak energy value, \$/MWh	28.01	u	from DOER memo 6/25/97, Attachment F-2
<b>On peak energy w/losses, \$/MWh</b>	<b>39.27</b>	v	t * 1.03, Company energy transmission loss estimate
<b>Off peak energy w/losses, \$/MWh</b>	<b>28.85</b>	w	u * 1.03, Company energy transmission loss estimate

1. From NEP W-95, Statement BL, Schedule 1, page 4 of 10

#### **D. Benefit/Cost Results**

Exhibit 1.4 - 1.4c presents a summary of the benefit/cost test results for the Company's 1998 energy efficient programs. These results are presented on a one-year basis of benefit/cost tests used by the Company. The overall Electric System benefit cost result for 1998 is 1.63. This result is used in the Company's Efficiency Incentive described in Section III.

The overall benefit/cost result for the simplified societal test is 1.70 for the 1998 programs. Summary results for 1999 are shown in Exhibit 1.5 - 1.5c.

As Exhibit 1.4 illustrates none of the residential programs are cost effective using the electric system test, while In-Home is cost-effective using the simplified societal test and Products has a benefit/cost of .98 in 1998. All of the commercial/industrial programs are cost-effective under both tests.

Individual program elements such as Residential Lighting and Energy Wise are cost-effective, but the new initiatives such as efficient clothes washers and ENERGY STAR® are not cost-effective on a one-year basis in 1998. As these programs mature, the Company anticipates that their cost-effectiveness will improve. This is illustrated in Exhibit 1.5 where the overall residential benefit/cost ratio in 1999 is .86 using the electric system test and 1.09 using the simplified societal test.

### **III. Proposed Incentive**

The Company's proposed Incentive has three components - a Maximizing Incentive, an Efficiency Incentive and a Performance Incentive for the Company's newer Initiatives. Exhibit 1.6 shows the overall structure of the incentive in detail. The addition of an incentive specifically for market transformation incentives is to align the Company's incentive with the Department's direction as put forth in DPU 96-100. The Company is proposing to increase the percentage of incentive that is allocated to individual Performance Metrics over time.

The incentive was designed to properly incentivize the Company. The Efficiency Incentive, which is based on the benefit/cost ratio of the electric system test is designed to reward the Company for being as cost-effective as possible. The Specific Performance Metrics for the Company's new initiatives are to ensure that these new program directions take place in 1998. The Maximizing Incentive which is based on lifetime kWh and lifetime kW is designed to award the Company for achieving as many savings as possible. These three components send the correct message to the Company's employees and management on these three balanced objectives.

The Specific Performance Metrics are based on the goals and the objectives of the Company's newer objectives. The Company is committed to participating in regional and national market transformation efforts that support its new initiatives. In some cases these specific metrics are closely aligned with regional efforts such as NEEP.

The component of the incentive includes a “kicker” (Part 2, Section K) for outstanding performance in supporting market transformation effort as measured by completion of 75 percent or over of the specific targets. This is measured in incentive dollars received.

In 1998, \$700,000 of the incentive is allocated to Specific Performance Metrics and the balance of the incentive is allocated equally to the maximizing and efficiency incentives (\$1.65M each). In 1999 the Specific Performance Metrics for the newer initiative will comprise \$1.33 million of the potential as opposed to \$700,000 in 1998. In 1999, each portion of the incentive is given equal weight of one-third. This is consistent with the Company’s strategy to continually increase its emphasis on market transformation and educational efforts over time.

The Company anticipates that more of the individual performance metrics used in 1999 will be based on measurements of market effects; particularly of some of the Regional programs. Since the program designs of the regional programs are not completed, the Company could not use the potential performance metrics of these programs at this time. If these designs are finalized before the MDPU’s completion of the Company’s filing, they may be substituted for some of the simplified metrics currently shown in Exhibit 1.6.

The Company is not filing Specific Performance Metrics for 1999 at this time. The Company proposes to file updated metrics for the 1999 program in September 1998, along with revised targets for the efficiency and maximizing incentives.



## **Exhibit 1.4**

### **1996 Benefit/Cost Test Summary**

To be inserted.

## Exhibit 1.4a

## Exhibit 1.4b

## Exhibit 1.4c

## Exhibit 1.5

## Exhibit 1.5a

## Exhibit 1.5b

## Exhibit 1.5c



## Exhibit 1-6

### 1998-9 Incentive

	<u>1998</u>	<u>1999</u>
<b>Part 1: Efficiency Incentive</b>	<b>\$1.65M</b>	<b>\$1.33M</b>

The efficiency incentive is based on the Electric System Benefit/Cost Ratio where the target for 1998 is 1.63<sup>7</sup>. This incentive is calculated as the ratio between the actual Benefit/Cost Ratio and the Target Benefit/Cost Ratio times the target Incentive of \$1.65M. This incentive has a minimum performance standard of a benefit/cost ratio in the electric system test of 1.0. If the benefit/cost ratio is less than 1.0, the Company receives no efficiency incentive.

This incentive is calculated as:

Actual B/C

Target B/C \* 1.65M = Earned Efficiency Incentive

### **Part 2: Specific Performance Metrics for Market Transformation and Other Initiatives**

#### **RESIDENTIAL INITIATIVES**

##### **A) Appliance Management Incentive**

- |   |           |   |
|---|-----------|---|
| <ul style="list-style-type: none"> <li>• Support WAP Agencies to serve 1,350 customers (scaled - no credit for less than 700 customers to full credit for 1,350)</li> </ul> | \$100,000 | * |
|---|-----------|---|

##### **B) Clothes Washers**

- |   |          |   |
|---|----------|---|
| <ul style="list-style-type: none"> <li>• Support NEEP efforts by participating in a regional program</li> </ul>   | \$25,000 | * |
| <ul style="list-style-type: none"> <li>• Provide rebates to 1,300 customers who purchase high efficiency clothes washers in 1998 (scaled - no credit for less than 650 customers to full credit for 1,300)</li> </ul> | \$25,000 | * |
| <ul style="list-style-type: none"> <li>• Develop a baseline of customer awareness of these products in 1998 in the MECo service territory</li> </ul>  | \$10,000 | * |

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<sup>7</sup>Based on target electric system benefit/cost test result from Exhibit 1.4. Target for 1999 would be 1.65 based on target electric system benefit/cost test result on Exhibit 1.5.

	<u>1998</u>	<u>1999</u>
<b>C) Home Appliance/ENERGY STAR® Retailer Program</b>		
• Enroll at least 25 retailers in the program and offer sales training	\$35,000	*
• Develop a baseline of consumer awareness of ENERGY STAR® in the MECo service territory	\$15,000	*
<b>D) New Construction</b>		
• Have 80 builders sign ENERGY STAR® Memos of Understanding (scaled - no credit for <40, full credit for 80)	\$20,000	*
	\$10,000	*
• Have at least 160 builders attend workshops		
• Complete at least 30 ground source heat pump installations in 1998	\$10,000	*
• Implement the lighting and appliance program elements	\$10,000	*
<b>E) Residential Lighting</b>		
• Support NEEP efforts to implement a joint utility program	\$25,000	*
• Provide Rebates for 10,000 ENERGY STAR® fixtures in MECo territory (scaled - no credit for less than 5,000, full credit for 10,000)	\$25,000	*
<b>COMMERCIAL/INDUSTRIAL INITIATIVES</b>		
<b>F) Industrial Systems Optimization Service</b>		
• To have under construction at least 6 projects with significant quantifiable productivity and/or environmental benefits	\$50,000	*
<b>G) Commercial Lighting Design and Guidelines Service</b>		
• To complete at least 4 demonstration projects under this service for 1998	\$25,000	*
• To develop and distribute commercial lighting guidelines for 4 space types	\$25,000	*
<b>H) Operations and Maintenance Services</b>		
• To sign up one school district under the energy manager salary guarantee program	\$10,000	*
• To fully develop an O&M training and certification program	\$25,000	
<b>I) Motor Incentive</b>		
• Increase by 20% or more the number of large vendors who sell at least 20% CEE - qualifying motors	\$20,000	*

	<u>1998</u>	<u>1999</u>
<b>J) Building Codes and Standards</b>		
• To support the development of new building codes and standards	\$10,000	*
<b>Total Incentive (A-J)</b>	\$475,000	*
<b>K) Outstanding Performance in Supporting Market Transformation Efforts</b>		
• This bonus is given if performance in A-J meets or exceeds 75% of the sum of the incentives earned in A-J (ie the sum of A-J exceeds \$356,250)	\$225,000	*
<b>Total Performance Metrics Incentives</b>	<b>\$700,000</b>	<b>\$1.33M</b>
 <b>Part 3: Maximizing Incentive</b>	 <b>\$1.65M</b>	 <b>\$1.34M</b>
<p>The 1998 maximizing incentive is calculated on a \$/lifetime MWh and \$/lifetime kW basis. The factors for 1998 are \$.4624 per lifetime MWh and \$1.73 per lifetime kW.<sup>8</sup></p> <p>This incentive has a minimum performance standard of 50%, so if lifetime MWh are less than 892,017 no incentive is earned on lifetime MWh. If the lifetime kW are less than 238,560 then there is no incentive earned for lifetime kW. Once the minimum performance standards are met the bonus is earned on all lifetime MWh and lifetime kW saved.</p>		
<b>Total Overall After Tax Incentive</b>	<b>\$4M</b>	<b>\$4M</b>

\* 1999 Performance Metrics will be filed with the MDPU on 9/1/98.

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<sup>8</sup> This is based on target 1998 lifetime MWh of 1,784,033 and lifetime kW of 477,121 from Exhibit 1.4a.

# COMMERCIAL/INDUSTRIAL ENERGY EFFICIENCY INITIATIVES

For well over a decade, Massachusetts Electric has operated effective efficiency programs in the commercial and industrial sector. This experience has led us to conclude that this market actually consists of three distinct subsectors, each with its own spectrum of efficiency opportunities and limitations. Additionally, there are diverse events in the life of equipment and buildings that create different types of opportunities for conservation. The business of achieving conservation savings and transforming conservation markets consists of identifying and addressing the unique barriers presented by each market and each type of event. In this chapter we provide an overview of the characteristics of these subsectors, the barriers to achieving efficiency opportunities in each, and the programs and services the Company has developed and deployed, and continually refined to overcome these barriers.

MECo's energy efficiency programs have achieved substantial energy savings. They also have influenced basic market behavior and transformed standard design and equipment practice for some technologies and in some market subsegments. We also describe this historic experience in this chapter because it provides the foundation for our proposed future efforts to further transform market practice. Our existing portfolio of programs are well-known, respected by customers and providers of equipment and services, and built into the business expectations of market participants. A key objective for the Company in this five-year plan will be to further focus these established initiatives towards market transformation objectives. In the past, market transformation has been an ancillary benefit to resources acquisition; in the future, it will become the primary objective.

The Company also will seek to develop new initiatives in partnership with other entities, including other utilities in the Commonwealth and the Northeast, the federal and state governments, energy-efficiency and community-based organizations, and equipment manufacturers and vendors to transform design and equipment specification practices in the region.

## I. Overview of the Commercial/Industrial Sector

There are many factors that create distinct patterns of decision-making among commercial and industrial customers, including size, type of organization, owner versus lessor, business types, etc. Size of electric load has proven to be one of the more useful ways of differentiating customers because it is strongly correlated with the customer frame of reference, receptivity to efficiency, capability to follow through on efficiency projects, and type of equipment, as described below. For program design purposes, MECo has divided the commercial and industrial sector into three segments: (1) customers with demand under 100 kW, (2) customers with demand between 100 kW and 200 kW, and (3) customers with demand over 200 kW. The characteristics of each of these three segments are described in Exhibit 2.1.

## Exhibit 2.1

Major Customer Segments with Typical Characteristics
<b>Customers with Demand up to 100 kW</b> <ul style="list-style-type: none"><li>• No energy manager</li><li>• High occupancy turnover rate</li><li>• Cash flow frequently a problem</li><li>• High percentage are national accounts; decision-maker not local</li><li>• Energy bills are a big concern</li><li>• Load mostly from lighting</li></ul>
<b>Customers with Demand between 100 kW and 200 kW</b> <ul style="list-style-type: none"><li>• Energy manager, often a facility manager with many other responsibilities besides energy management</li><li>• High occupancy turnover rate</li><li>• Cash flow frequently a problem</li><li>• High percentage of national accounts; decision-maker not local</li><li>• Energy bills are a concern</li><li>• Load mostly from lighting and HVAC</li></ul>
<b>Customers with Demand over 200 kW</b> <ul style="list-style-type: none"><li>• Energy manager, often a facility manager with many other responsibilities besides energy management</li><li>• Low turnover rate</li><li>• Cash flow often not a problem</li><li>• Decision makers are local</li><li>• Energy bills are a less of a concern - producing product or providing service is biggest concern</li><li>• Load mostly from HVAC</li></ul>

To some degree, the factors shown in Exhibit 2.1 vary among customers of the same size depending on many other considerations. However, the pattern shown in the exhibit is still relevant. There are customers with significant interest and resources to pursue energy efficiency, others with more modest interest and resources, and still others with very limited interests and resources. Programs must be designed to differentiate along and address this spectrum of customer needs.

Within the commercial and industrial market as a whole, there are four groups of activities that present distinct opportunities to encourage energy efficiency investment. These are: new construction and renovation, remodeling, replacement of failed equipment, and replacement of existing, operating equipment (retrofits). These first three are “market driven activities”, meaning that they will take place in the

normal course of business, with or without utility intervention; the fourth, retrofit, is a utility-driven activity.

While this segmentation is simplified, it is sufficient to serve as a basis for a discussion of the proposed focus of our energy efficiency objectives for the next five years. Other equally valid approaches have been presented elsewhere.<sup>9</sup>

## **II. Barriers to Implementation of Energy Efficiency**

A key public policy rationale for developing utility-based energy efficiency programs in the mid-80s was that rapidly rising energy prices were not producing the responsive level of customer investment in energy efficiency technologies that would be expected in a perfect market. If price-response conservation had been optimal, utility resource acquisition programs to meet energy resource requirements could have been far more modest and targeted. Clearly, market barriers existed. These included: high information and search costs, uncertainty about the performance of complex and unfamiliar technologies, asymmetric information and opportunity, perceived inconvenience of proposed installations, high transaction costs, lack of access to financing, business investment criteria and professional practices or customs that devalued or undervalued energy efficiency, misplaced or split incentives, and product or service unavailability.<sup>10</sup> The fact that many of these barriers have been measurably lowered is a testament to the value of 15 years of concerted utility and public efficiency program efforts. The fact that all of these barriers remain with us still, albeit to lesser degrees and in some cases for fewer markets, is a statement to their persistence and pervasiveness.

The regulated utility industry did not give rise to these barriers; they are basic conditions of energy-consuming building, equipment, and service markets. Therefore, it is very likely that they will continue to exist in a deregulated market as well. While we can assume that the competitive market will give rise to some new and creative packages of energy and energy services, the actual experience to date in jurisdictions that have restructured their markets, such as the United Kingdom and New Zealand, is that competition has not produced a significant increase in energy efficiency investments. The experience in domestic deregulated markets has been similar. For instance, gas marketers have generally not used gas efficiency as a sales strategy.<sup>11</sup>

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<sup>9</sup>(Gordon, Frederick M., Bonneville Power Administration's Commercial Sector Market, BPA publication # DOE/BP-2008, December, 1992, Portland, Or.)

<sup>10</sup> *A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs*, J. Eto, R. Prahl, J. Schlegel, Lawrence Berkley National Laboratory, July, 1996, pp. 13-16

<sup>11</sup>Final written comments of the New Hampshire Collaborative in Docket 96-150 New Hampshire Public Utilities Commission, Paul Gromer, Douglas Baston et al.

In fact, barriers to achieving energy efficiency opportunities may actually increase in a restructured market in the short run, as uncertainty regarding future energy prices, promises of energy bill savings from competing suppliers, the complexity of competing pricing plans, and the presence of a large fixed customer charge to amortize stranded asset obligations, all conspire to make efficiency investment opportunities even more difficult to analyze.

Among the market-based barriers that will clearly continue to exist in the immediate post-restructuring environment are the following.

- *Lack of Information and High Search and Verification Costs:* Lack of clear, unbiased information about the costs, savings, and reliability of energy efficient equipment and design techniques is a major issue for decision-makers. One may expect that this problem will only grow as many new providers enter the energy services market and compete for customer attention. Historically, customers have had difficulty identifying reliable technologies and contractors to provide efficiency, and have looked to their utility and to public programs for unbiased guidance.
- *Uncertainty About Performance of Complex, Unfamiliar Technologies:* Energy consumption is a peripheral concern to all but the largest and most energy-intense industrial customers or very large commercial enterprises, such as restaurant chains or large owner-managed property developers. The average customer, for whom energy costs represent only one to three percent of operating costs<sup>12</sup>, is understandably reluctant to risk application of unfamiliar technologies in an area that accounts for a relatively small share of the costs of their enterprise, particularly if they lack the knowledge to assess whether central concerns -- customer comfort and satisfaction or worker morale or productivity -- could be put at even marginal risk.
- *Product Unavailability:* Manufacturers still will be reluctant to develop, and distributors will be reluctant to stock, high efficiency equipment if demand is uncertain and competition remains first-cost based.
- *Misplaced Incentives:* The innate structure of the commercial real estate development market, which places a "first-cost" pressure on designers and equipment specifiers, will continue to price out efficiency measures and design features in new construction. Subsequent "building consumers" -- owners and tenants -- will continue to bear higher life-cycle energy costs as a result.

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<sup>12</sup>

Ornstein, Alfred and Michaels, Harvey, "Marketing Energy Efficiency to Commercial Customers - What Have We Learned?"

These barriers apply to the vast majority of commercial and industrial customers who have no internal staff to identify or evaluate potential investments in efficiency equipment or energy efficient design. To the extent that these customers are even aware that options exist, they tend to rely on their vendors to identify and recommend them. However, many vendors are often reluctant to recommend options that have a higher first cost (particularly in competitive bid situations), depart from conventional practice, or require non-stock equipment. For instance, many HVAC contractors tend to learn their craft on the job and rely on a series of “rules of thumb” rather than site-specific calculations to size equipment. These rules tend to oversize equipment as a simple way to err on the side of reliability and customer satisfaction. Vendors recognize, correctly, that energy costs are seldom the basis for a call-back or customer complaint. They also know that proposals that promise significant energy savings will be quickly discounted if customers perceive a risk to central business concerns. For instance, a proposal to “right-size” a replacement HVAC unit may be rejected because it is perceived to cut the margin of safety for ample cooling. While load research has demonstrated that this is usually not the case, contractors often do not know this and do not perform the calculations needed to size equipment more precisely.

Even in those instances where a customer has expressed interest in pursuing an efficiency opportunity, carrying a project forward to fruition requires a significant investment of management time to review energy efficiency options, obtain internal support and/or funding, bid the project, select suppliers and installers, oversee the installation (including integrating it with core business activity and to minimize production interruptions). In a period of intense competitiveness and corporate downsizing, management time is a constrained resource. Time spent considering energy efficiency investments supplants time available for other projects and opportunities in the core business.

When electrical equipment fails or a remodel is planned, there is a brief window of opportunity to influence the choice of a replacement. But the customer’s overriding objective is to restore the function driven by the electric device, be it a cooled office environment or a factory assembly line. In order to capture these opportunities, high efficiency equipment must be as readily available (and “available” means unencumbered by burdensome utility qualification procedures) as standard efficiency equipment. Experience in several markets, perhaps most prominently electric motors, indicates that absent a sustained and predictable public or utility program to support the stocking of energy efficient products, vendors will be reluctant to routinely specify high efficiency equipment.

One market barrier truly is an artifact of the regulated utility industry: balkanized and conflicting utility efficiency program qualification criteria and incentives. While many utilities have been aggressive in promoting energy efficiency programs to their own customers, there has been little coordination among utilities to promote consistent



program qualifications and incentives across regional markets. It has long been a source of customer and trade ally frustration, and a limiter to their participation in efficiency programs, that they must absorb the burden of sorting out differing utility program requirements and incentive schemes. This is particularly the case with customers that have facilities in multiple service territories or vendors and designers who work region-wide. In addition, markets for efficiency are, at a minimum, statewide, and more likely region-wide; and utility service territories do not generally coincide with these natural economic regions.

Massachusetts Electric is firmly convinced that the success of transforming Massachusetts and New England efficiency markets will ultimately depend on the degree to which individual distribution utilities are prepared to work collaboratively to develop common state-wide or region-wide program specifications as a platform to their individual program marketing and program delivery efforts.

### **III. Overcoming Market Barriers Using Existing Energy Efficiency Programs**

Through its 10 years of operating energy efficiency programs, Massachusetts Electric has learned much about the nature of the barriers discussed above and how to address them. Over time, we have refined our programs in response to this practical experience. We now cluster our efforts under three principal energy efficiency programs, each directed to different market segments. Design 2000, Energy Initiative, and Small C/I each combine financial rebates with other supportive educational, technical, and financial services to assist customers in identifying, analyzing, and implementing efficiency opportunities in their facilities.

Originally, the primary objectives of each of these programs was resource acquisition (to capture for Massachusetts Electric all cost-effective efficiency opportunities in order to defer or reduce the need for new generating capacity) and customer service (to help customers reduce costs by using electricity as efficiently as possible in their facilities). As these programs evolved and matured, it became increasingly apparent that they also were serving to permanently transform markets by changing the standard practice of equipment specification and building design. The markets that have been most directly affected by these programs are described in Section IV below.

Design 2000 and Energy Initiative focus primarily on the second two customer segments described above in Exhibit 2.1: customers with demand between 100 and 200 kW and customers with demand over 200 kW. Design 2000 addresses efficiency opportunities in new construction, remodeling and failed equipment, while Energy Initiative and Small C/I address retrofit opportunities. Because all three programs directly assist in transforming energy efficiency markets, the Company plans to continue offering them, albeit with a number of changes, over the next five years.

Exhibit 2.2 illustrates the market transformation mechanisms contained in each program and the specific markets and end-uses they strive to transform. The Company believes that these markets or subsets of them will not be heavily targeted by ESCOs and other energy service providers. As a result, during the next two to five years utility intervention is still required to assist in transforming them.

As the competitive marketplace evolves and design practices and markets for specific end-uses are transformed, they will be continuously refined. This is a critical variable in planning these programs over the five-year planning horizon. For example, rebates for energy conservation measures that have been transformed will be removed from the program, or rebates and payback criteria will be changed to reflect the decreasing need for market intervention. In this way, continued implementation of these programs is designed to compliment competitive market forces and not compete with them. In fact, the Company anticipates that energy service providers, as they have in the past, will continue to use the services offered through utility energy efficiency programs to pursue energy efficiency opportunities in customers' facilities.

## **A. Existing Programs**

### **1. Design 2000**

Design 2000 is a market-based program that targets "time-dependent" opportunities for the installation of energy efficient equipment and systems. The program provides financial incentives and technical assistance to developers, customers and design professionals to encourage the adoption of design features, and selection of equipment that optimize the efficient use of energy. Financial incentives are designed to cover between 75 percent and 90 percent of the incremental cost between standard and premium efficiency equipment to help customers overcome the first-cost barrier to investment in energy efficiency.

Design 2000 targets all commercial and industrial new construction, renovation and remodeling projects, and the failed equipment replacement market. The program seeks to ensure that consideration of energy efficiency options becomes an integral part of the design process, and that a significant percentage of new construction is efficiently built as a result. By exposing designers to what is possible in the early design phase, the program seeks to raise the energy efficiency standards of normal building practice.

Design 2000 offers a myriad of services to address the market barriers outlined in Section II and that help to transform markets. These services are described in more detail later in this Section.

The budget for Design 2000 will decrease from \$14.3 million in 1997 to \$13.1 million in 1998 and \$12.4 million in 1999. An additional \$800,000 will be devoted to new market transformation initiatives as outlined in Section V. The lifetime energy and demand savings will be 764,968 MWh and 169,713 kW respectively in 1998 and 716,700 MWh and 159,005 kW respectively in 1999. The budget for Design 2000 is expected to decline slightly from 1999 through 2002 while the budget for new market transformation is expected to remain relatively constant.

## **2. Energy Initiative**

Energy Initiative is a retrofit program that targets energy efficiency opportunities in existing commercial, industrial, and governmental facilities. Energy Initiative targets savings opportunities in existing mechanical and electrical systems where the equipment continues to function, but is outdated and energy inefficient. Energy Initiative offers rebates and technical assistance to help customers analyze their existing operations with a focus on reducing energy costs. The existing commercial and industrial building stock offers the greatest energy-savings potential in the C/I sector, because only a small increment is added to the market each year through new construction, expansions, or renovations. Energy Initiative offers customers the opportunity to replace equipment in a number of different electrical end uses, including: energy efficient lighting, premium efficiency motors, HVAC, and variable speed drives. Energy Initiative rebates are designed to cover roughly 50 percent of the total installed costs (equipment and labor) of new high efficiency equipment, or to buy the cost of the equipment down to a two-year payback to the customer, whichever is less.

Similar to Design 2000, Energy Initiative offers a range of services that address specific market barriers and help transform markets. A description of how this program transforms markets is found in Sections IV and V.

Over the next five years, MECo sees a diminishing, but still important, role for Energy Initiative in capturing energy efficiency savings, as is reflected in the proposed budget described below. The primary target of the program, retrofit opportunities in larger commercial/industrial facilities, is also the market most likely to be targeted by energy service providers. Consequently, over time, the need for Energy Initiative to incentivize the market may decrease. For example, in general, energy efficiency measures with paybacks of less than three years such as lighting and motors in institutional and public facilities have been and most likely will continue to be seen by energy service providers as prime opportunities to pursue. It is likely that other market segments and end-uses will be targeted aggressively by such providers as well. As a result, MECo can

gradually reduce its investment in the program as the competitive markets gain momentum. The Company believes however that certain markets may not be of interest to energy service providers for a variety of factors. For this reason, the Company proposes to continue to offer the program, albeit at a significantly lower budget over the next five years.

The budget for Energy Initiative will decrease from \$12.8 million in 1997 to \$10 million in 1998 and \$8.9 million in 1999. The lifetime energy and demand savings will be 608,286 MWh and 119,976 kW respectively in 1998 and 528,647 MWh and 104,268 kW in 1999. The budget is expected to continue to decline significantly between 2000 and 2002.

**a. Accelerated Application Process**

During 1995 and 1996 MECo offered a small group of customers a pilot program called the "Alternative Financing Pilot" (AFP) program with the approval of the MDPU in Order 94-112. Under this five-year plan the company is proposing to offer a similar program called the Accelerated Application Process under Design 2000 and Energy Initiative to all C/I customers. The design of this process reflects the special requirements of certain customers in order for them to pursue energy efficiency measures in their facilities. Through it, the Company believes these customers may install more energy saving measures than may have otherwise been installed under its existing programs. The Company has been developing this application process in collaboration with The Energy Consortium, Associated Industries of Massachusetts, the Conservation Law Foundation, the Northeast Energy Efficiency Council and the Division of Energy Resources.

The specifics of this application process are described in Appendix B. In brief, the major changes from the pilot include:

- opening the program up to all MECo C/I customers
- reducing project payback eligibility from one year to six months.
- a two year rolling period of participation
- services such as Technical Assistance and Commissioning will not be available to participants.
- participants can recover up to 85% of the funds paid through monthly MECo charges for its C/I energy efficiency projects.

A number of major issues remain to be resolved with the parties over the next several weeks. The ultimate delivery of this program is contingent upon the successful resolution of these issues. These include the method for calculating each participants annual contribution to the Company's C/I energy efficiency programs, the

structure of the two year rolling period for participation, and the establishment of a flexible cap on the level of rebate spending that can flow through this process. The resolution to these issues will be filed with the DPU as a supplement to this Energy Efficiency Plan.

Parties to this collaborative effort have agreed to explore means through which C/I customers with facilities in multiple utility territories can aggregate the funds they contribute to utility efficiency programs and apply these funds to efficiency projects in facilities regardless of which service territory they are in. TEC and AIM have expressed interest in establishing reciprocity between utility efficiency programs which would enable a customer to use conservation funds that they pay to one utility through its distribution charges in the service territory of another utility. Some of the parties are interested in exploring this concept and will evaluate its potential in the 1998 program year, although it is doubtful that such a plan, if feasible, would be operable until after 1998. Other parties to this collaborative process including CLF have serious reservations about this approach because they believe it conflicts with fundamental state regulatory policy and has a number of practical problems associated with it. All of the parties agree that promoting uniformity between MECO's proposed accelerated application process and other Massachusetts utilities' C/I efficiency programs will help to address these objectives and will support such an effort.

### **3. Small Commercial and Industrial Program**

The Small Commercial and Industrial Program provides direct retrofit installation of energy efficient lighting and other measures. Customers with an average monthly demand of less than 100 kW, or an annual energy usage of less than 300,000 kWh, are eligible for this program. The Company pays for 80 percent of total project costs, and customers may finance the remainder for up to 24 months interest-free. Some of the available technologies offered through the program include: energy efficient fluorescent ballasts, lamps, and fixtures; hard-wired and screw-in compact fluorescent systems; high intensity discharge systems; occupancy sensors; programmable thermostats; hot water tank insulation wraps; and fan control and door heater control devices for walk-in coolers.

Customers in the targeted market segment tend to have a significant lighting load (as a percentage of total load) and a historical reluctance or inability to fund efficiency improvements. Also, their small size tends to exclude them as potential beneficiaries of ESCo services. For these reasons, the Company plans to continue offering Small C/I over the next five years. The budget for the program will decrease from \$9.2 million in

1997 to \$7.5 million in 1998 and \$6.1 million in 1999. The lifetime energy and demand savings will be 192,639 MWh and 62,495 kW respectively in 1998 and 156,080 MWh and 50,628 kW in 1999. The budget is currently expected to decline significantly between 2000 and 2002.

## **B. Existing Service**

The following services are offered to customers through Design 2000 and Energy Initiative to help overcome barriers to the installation of energy efficient equipment. The budget for these services are subsumed in the budgets for Design 2000 and Energy Initiative.

### **1. Technical Assistance (TA)**

The Technical Assistance Program operates as a component of both Design 2000 and Energy Initiative. It provides customers with access to sophisticated technical resources that can thoroughly evaluate potential energy efficiency opportunities in their facilities and ensure that all measures that qualify under the program are installed properly. In conjunction with Company staff, customers utilize technical assistance services for such tasks as: measure identification, equipment metering or monitoring, technical evaluation, customer presentations, design/construction assistance, or inspections. These consultants also may be used to conduct a detailed engineering study of energy efficiency opportunities in a facility. (Costs of these studies are usually shared with the customer.)

Technical Assistance Services help get measures installed. This builds an experiential base with new technologies that over time leads to broader market acceptance of these technologies. In addition, TA Services demonstrate to customers that there is a value in investing in engineering analysis of efficiency opportunities. At the same time, the program helps Massachusetts Electric establish standards for quality in TA and trains a labor force in quality delivery. The combination of demonstrated customer benefit, clearer standards, and a growing qualified labor force may lead to increased unsubsidized use of TA-type services, particularly among larger and more sophisticated customers.

## Exhibit 2.2

Transforming Targeted Markets Using Existing Energy Efficiency Programs and Services		
Existing Energy Efficiency Programs	Existing Services	Targeted Market*
<b>Design 2000</b>	<ul style="list-style-type: none"> <li>• Financial Rebates</li> <li>• Technical Assistance</li> <li>• Education</li> <li>• Financing</li> <li>• Commissioning</li> <li>• Comprehensive Design Approach</li> <li>• Unitary HVAC Service</li> <li>• Failed/Stocked Motors Service</li> <li>• Ballast Recycling</li> </ul>	<ul style="list-style-type: none"> <li>• T-8 lighting in customers' facilities under 200 kW</li> <li>• Lighting control strategies</li> <li>• Practices of architects, lighting designers and design engineers</li> <li>• Premium efficiency motors</li> <li>• VSDs</li> <li>• Behaviors away from 'rules of thumb' toward systems integration</li> <li>• Window technologies</li> <li>• Compressed Air Systems</li> <li>• Chillers</li> <li>• HVAC equipment</li> <li>• Process Measures</li> <li>• Energy Management Systems</li> </ul>
<b>Energy Initiative</b>	<ul style="list-style-type: none"> <li>• Financial Rebates</li> <li>• Technical Assistance</li> <li>• Education</li> <li>• Financing</li> <li>• Commissioning</li> <li>• Ballast Recycling</li> </ul>	<ul style="list-style-type: none"> <li>• T-8 lighting</li> <li>• HID lighting and controls</li> <li>• Premium efficiency motors</li> <li>• VSDs</li> <li>• Energy Management Systems</li> <li>• Process Measures</li> </ul>
<b>Small C/I</b>	<ul style="list-style-type: none"> <li>• Financial Rebates</li> <li>• Financing</li> <li>• Technical Assistance</li> <li>• Education</li> <li>• Turn-key Service</li> <li>• Ballast and Lamp Recycling</li> </ul>	<ul style="list-style-type: none"> <li>• T-8 lighting</li> <li>• Hard-wired compact fluorescent lighting</li> <li>• HID lamps</li> <li>• Lighting controls</li> <li>• Walk-in cooler measures</li> </ul>

\*MECo believes based on its experience delivering energy efficiency programs that ESCos and other energy service providers are going to target other, more lucrative markets and not these.

**2. Comprehensive Design Approach**

The Comprehensive Design Approach (CDA) option under the Design 2000 Program provides a menu of services that assist customers in designing and constructing new facilities at optimal efficiency levels. CDA either provides outside expert technical support to the client's own design team, or reimburses the incremental cost of the additional time required by that team to analyze all cost-effective efficiency options. Typically, technical assistance consultants will carry out full computer simulations of building performance prior to screening measures for cost-effectiveness. A successful CDA project reduces the customer's electrical consumption by identifying and incorporating cost-effective design alternatives early in the design phase, when the cost of modifications are minimal and disruption to construction schedules can be avoided.

**3. Chiller Initiative**

Chiller Initiative (CI) is offered by MECo as a combined application of Energy Initiative and Design 2000. It is a comprehensive building retrofit program centered around the replacement or conversion of CFC (R-11, R-12 refrigerant) chillers. The goal is to help customers optimize their building operating systems at the time of CFC change-out or chiller replacement.

Chiller Initiative provides customers with the opportunity to either optimize the performance of older building systems or to receive technical assistance and recommendations for the proper size and machine efficiency for a replacement chiller plant. The federally-mandated phase-out of CFC refrigerants will require facility owners to make some investment decisions. The Chiller Initiative provides them with the information they need to understand their options and choices and to make the best long-term decision for their particular facility and investment objectives.

This service also helps Massachusetts Electric reduce peak summer system demand. Thus, Chiller Initiative provides for long-term positive cost benefits for both parties while improving the environment in the region.

**4. Commissioning**

Commissioning is a technical and educational service offered through Design 2000 and Energy Initiative. Building commissioning provides independent, third party verification that complex building systems, usually HVAC projects involving energy management systems or other controls, are operating according to design intent. As a result of our five years of experience operating this service, MECo has concluded that, absent commissioning, these complex systems seldom operate as designed. Thus, they do not yield the projected energy and cost savings to either the



customer or the utility. Over the five-year life of this service, the 134 projects commissioned represent more than 90,000 MWh of annual electric savings.

Like Technical Assistance, Commissioning is a valuable service for customers. It helps to ensure that the savings they expect from the equipment in which they (and the Company) have invested is actually achieved, and that the equipment operates at optimal design performance levels for the comfort of building occupants.

On a trial basis, as a follow-up to commissioning and as a way to integrate an Operation and Maintenance service, Massachusetts Electric will continue to monitor and evaluate the performance of 10 to 12 commissioned systems. This monitoring will help the Company determine the persistence in operation of commissioned control systems so the Company can determine if it will continue to obtain the level of savings initially achieved.

## **5. Financing**

Massachusetts Electric offers a Financing Program to remove the capital barrier to program participation not addressed by rebates. The program provides access to capital to finance non-rebated project costs, primarily through Citicorp Leasing Incorporated. Alternative capital sources also are available to accommodate individual customer needs and preferences.

The Financing Program has many features to accommodate customer financing needs, including: no application or documentation fees, an up-front cash requirement that is limited to the first month's lease payment, flexible repayment terms (two - seven years), and a simple application process. The program can accommodate projects ranging from \$5,000 to \$4,000,000

Financing is marketed to customers in a variety of ways. Account Representatives have promotional materials and a capital investment/cash flow computer model which can calculate a variety of project financial scenarios for the customer.

Financing may be a useful transitional tool to help customers find the capital necessary to install measures as rebates are reduced. However, our efforts may also help build a more effective private sector efficiency financing market. Currently, many lenders consider loans for energy efficiency investments to be "unconventional," because the equipment is widely dispersed and closely integrated into building systems (reducing the effectiveness of an equipment lien), the relationship to other debt is difficult

to identify, and the financing is often requested in small amounts. The Company is working with lenders now not only to get measures installed, but to demonstrate to the lending community the viability, safety, and profitability of energy-related financing.

**6. Ballast/Lamp Recycling Service**

A ballast recycling service is offered at no cost to those customers who install energy efficient lighting under the Energy Initiative or Design 2000 Programs. Customers who participate in the Small C/I program are offered recycling of both the old ballasts and lamps that were removed, also at no cost. This service is offered because the Company wants to ensure that all ballasts (some of which can contain polychlorinated biphenyls -- PCBs) removed under our energy efficiency programs, are disposed of in an environmentally sound manner. Through a rigorous selection process, MECo has qualified two ballast/lamp recyclers to provide this service. MECo tracks the ballasts and lamps from customer facilities through to final recycling.

## **IV. Success in Market Transformation to Date**

The efficiency improvements in customer facilities which have resulted from the successful implementation of the Design 2000, Energy Initiative and Small C/I programs over the past eight years can be viewed in several ways.

Exhibit 2.3 shows the combined market penetration of all three programs in the three market segments described in Section I, (see Exhibit 2.1), the energy and demand savings produced in each segment, the average savings per participant, and the potential additional savings that could be achieved if all remaining customers participated at the same level as past participants. The projection of remaining savings potential is relatively uncertain for several reasons. First, despite our success in the customer segment over 100 kW, many cost-effective efficiency opportunities remain in these same facilities. MECo believes the average savings that are potentially attainable from participants is higher than shown. Second, efficiency opportunities between participants and non-participants may vary considerably. Thus, the level of savings already achieved in participant facilities may not be a good predictor of savings remaining in nonparticipants' facilities. These cautions aside, Exhibit 2.3 clearly indicates both that considerable energy and demand savings have been achieved and that substantial savings potential remains.

### Exhibit 2.3

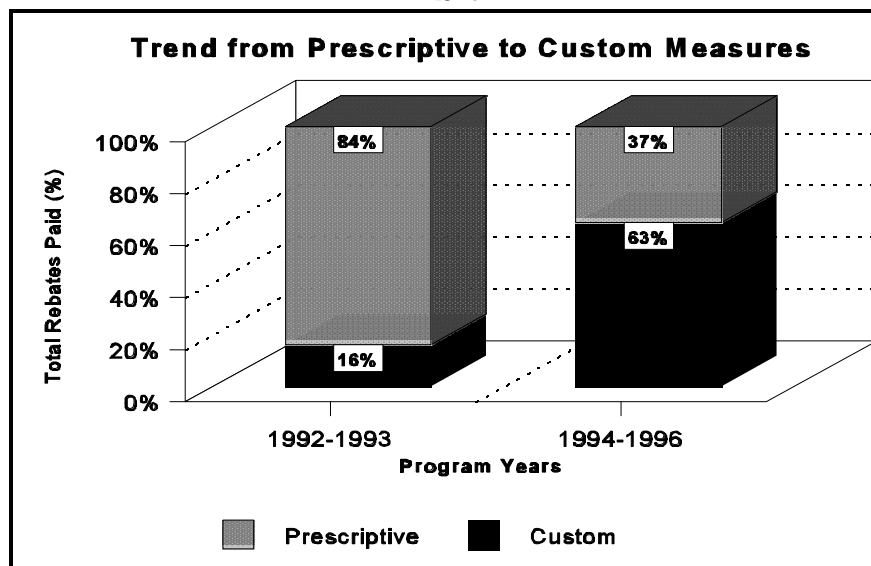
<b>Penetration of Customer Segments Through C/I Energy Efficiency Programs</b>				
	Less than 100 kW	100 - 200 kW	Over 200 kW	Total
Number of Current Customers	52,575	2,460	1,996	57,031
Number of Customer Participants	15,367	1,316	1,407	18,090
% Participation	29%	54%	70%	31%
Annual Gross kW Saved	47,914	11,088	65,071	124,073
Gross Annual kWh Saved	148,059,554	45,690,054	326,322,500	520,072,108
Avg. Annual Gross kW Saved per Participant	3	8	46	7
Avg. Annual Gross kWh Saved per Participant	9,635	34,719	231,928	28,749
Annual Gross kW Savings Remaining (non participants x avg kW savings)	88,738	9,639	27,240	125,617
Annual Gross kWh Savings Remaining (non participants x avg savings)	274,212,100	39,718,406	136,605,510	450,536,016

## 1. Design 2000

Design 2000 was first offered in May 1989 and has aggressively pursued “lost opportunities” in customers facilities since its inception. In the early years, lighting savings predominated. Utility efficiency programs advanced customer acceptance of high efficiency lighting equipment.<sup>13</sup> As new technologies emerged in other end-use sectors, savings became more evenly distributed.

As the program matured, its focus shifted to comprehensive treatments through improvements in building design. The program has been in steady transition from a primarily prescriptive approach to comprehensive energy solutions that target customer-specific opportunities (see Exhibit 2.4). As a result, the program has had an increasing influence on standard baseline construction practice.

**Exhibit 2.4**



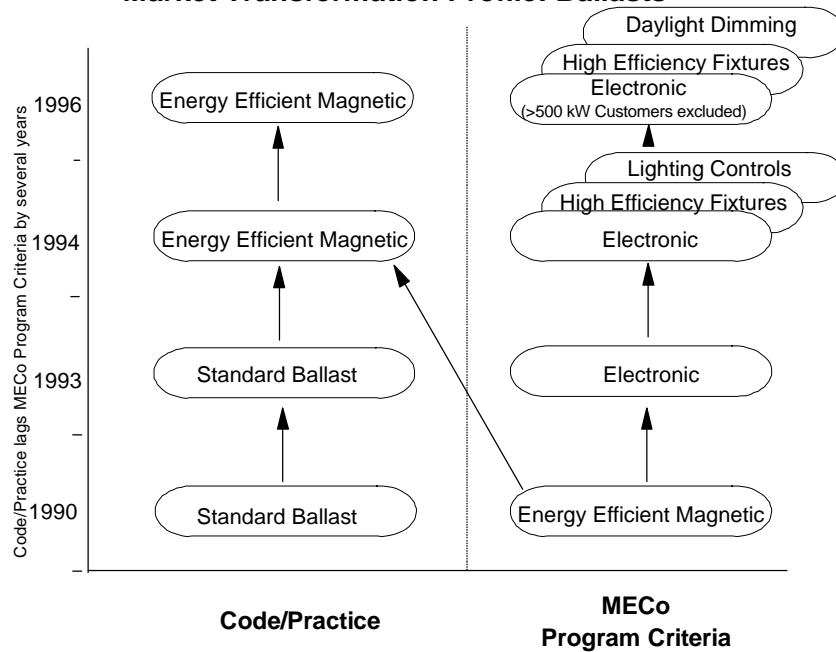
In lighting, T-8 lamps and electronic ballasts are now viewed as standard equipment in larger new commercial construction projects. This transformation is evident by examining the trend towards energy efficient magnetic ballasts coupled with sound lighting control strategies (Exhibit 2.5).

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<sup>13</sup>Easton Consultants, “New England Commercial Lighting Market Transformation Study 1997 - the utility stimulus accelerated fluorescent lamp and ballast sales penetration into the market by several years.”

## Exhibit 2.5

### Market Transformation Profile: Ballasts



In HVAC systems, the program has helped to change standard design practice from constant air volume systems to variable air volume systems. It is also now common practice to attach drive controls to premium efficiency motors. Based on discussions with vendors and customers, MEdCo feels that the program particularly influenced this change in the smaller motor range. Similarly, motor baselines will be upgraded in 1997 based on new federal standards that would not have proceeded without utility programs to demonstrate market acceptance for premium efficient motors. In new chilled water plants designers now specify variable speed pumping on secondary chilled water lines and multi-speed cooling tower fans. In commercial refrigeration applications, multiplex refrigeration racks, VSD's for compressors, and demand defrost controls are now standard design practice. All of these examples of market migration towards the more efficient design or equipment option can be linked directly to the influence of the Design 2000 Program.

## Exhibit 2.6

### Transformation of Technologies

#### Migration Toward Energy Efficiency Practices

Measure Type	1990	1993	1994	1996
<b>Lighting</b> NEES Standard Code/Practice Controls Adoption	T-12/EE Magnetic F40/Std Ballast minimum	T-12/T-8 Electronic F40/Std Ballast minimum	T-12/T-8 Electronic F-34/EE Magnetic increased	T-8 Electronic F-34/EE Magnetic increased
<b>Motors</b> NEES Standard <sup>1</sup> Code/Practice	15 HP 91.5 % Eff 15 HP 91.0%	15 HP 91.7 % Eff 15 HP 91.0 %	15 HP 91.7 % Eff 15 HP 91.0 %	15 HP 91.7 % Eff <sup>2</sup> 15 HP 91.0%
<b>HVAC</b> NEES Standard Code/Practice <sup>3</sup>	Package 8.6 EER 8.3 EER	Package 9.2 EER 8.9 EER <sup>4</sup>	Package 10.0 EER 8.9 EER	Package 10.0 EER 8.9 EER
<b>Drive Technology</b>	Minor market acceptance	Increased market acceptance	Increased market acceptance	Often standard practice

<sup>1</sup> ODP/1800 rpms

<sup>2</sup> 1997 NEES Std. 92.4% efficiency exceeds 1997 EPACT standard

<sup>3</sup> 5.5-11.0 ton units

<sup>4</sup> New England HVAC Baseline Study

Exhibit 2.6 illustrates the changes in levels of efficiency in building construction since 1990. It can be seen that common, baseline specifications for a number of electric end-uses measures have moved from code minimums to substantially more advanced technologies.

The Comprehensive Design Approach (CDA) a service within Design 2000, targets the design professional and through its application advances market transformation. The CDA approach engages the designer in an examination of alternative design practices and equipment options that focus on sustainability and efficiency. It is through this integrated design process that progress in technologies and techniques are supported. Moreover designers change the methods they use to design commercial buildings based on experience applying the CDA. This practical experience cements change in new construction design practice that is lasting and permanent.

## 2. Energy Initiative and Small C/I

Energy Initiative and Small C/I also have been instrumental in transforming markets for high efficiency equipment. Market transformation often means overcoming inertia in the marketplace that favors known equipment and tried-and-true design practices. Due to the limited volume in new construction and equipment replacement markets, it is sometimes difficult to build enough pressure to overcome these forces without using retrofit programs such as Energy Initiative and Small C/I to "turbo charge" efficient markets. By building equipment sales volume, these retrofit programs have helped jump start the transition to high efficiency technologies by signaling to equipment manufacturers that there is a market for higher efficiency equipment.

For example, high volume sales for electronic ballasts in Massachusetts helped convince manufacturers to increase production capacity and persuaded distributors to stock efficient models as "standard". High demand, spurred by retrofit programs, increased product availability, reduced delivery times, and lowered prices, are crucial to transforming markets.

As a high volume purchaser, Massachusetts Electric also could influence manufacturing quality standards. Our harmonic quality and power factor standards for VSDs and ballasts have strongly influenced design for these measures nationwide.

This example highlights the strong rationale for retaining retrofit programs like EI and Small C/I through the five year planning cycle as integral components of our market transformation program mix.

- Retrofit activities are critical components of a comprehensive strategy to capture lost opportunities. For example, Chiller Initiative helps customers downsize new chillers only after lighting systems have been retrofitted. In the absence of an EI, lighting retrofit, customers would require larger, more costly chillers, with higher peak demand and, in some cases, more energy use.
- In the short term, it is important to retain retrofit programs as a reservoir of "at ready" capability for T&D deferral or unforeseen seasonal power shortages due to unscheduled plant outages.
- Retrofit programs may continue to be important tools in the portfolio of economic development options to retain or expand businesses in the Commonwealth. Massachusetts Electric

programs have a solid record of helping businesses improve their productivity and lower costs through efficiency retrofits.

- Some very cost-effective conservation opportunities cannot be addressed through market-driven or equipment-driven programs because, in the natural market, the inefficient equipment will remain in place indefinitely. Where retrofit opportunities still provide significant societal net benefits, it makes sense to address these opportunities through incentives. This is particularly true for customer groups who would not otherwise be served.

## **V. New Energy Efficiency Services**

Over the next two- to five-year period, MECo plans to focus its commercial/industrial energy efficiency efforts on the following four principal objectives:

- Permanently transforming markets for major electric end-uses toward high efficiency options;
- Capturing lost-opportunities associated with new construction, remodeling, and renovation;
- Capturing retrofit opportunities with greater than a two- or three-year payback; and
- Identifying the next generation of emerging efficiency technologies and design techniques and bringing them into the market.

The Company is convinced by its own experience and that of others that these are markets that will not be broadly tapped by other energy service providers, such as power suppliers and ESCos. MECo plans to target these markets by supplementing its existing base of programs and services with a number of new initiatives, which will be discussed below.<sup>14</sup>

These new programs will include:

### **Collaborative Initiatives:**

- Consortium for Energy Efficiency (CEE) Initiatives
- Northeast Energy Efficiency Partnership (NEEP) Initiatives
- North American Technician Excellence Program

### **Company-led Initiatives:**

- Industrial Systems Optimization Service

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<sup>14</sup>As noted above, MECo has been for some time evolving its existing programs towards market transformation and lost opportunity objectives; MECo will complete this transition during the period covered by this plan.



- Commercial Lighting Design and Guidelines Service
- Operations and Maintenance Services
- Building Codes and Standards
- Torchiere Initiative

## Exhibit 2.7

### Summary of C/I Energy Efficiency Programs/Initiatives for 1998-2002

#### Existing Programs/Services

##### Programs

- Design 2000
- Energy Initiative
- Small C/I

##### Services

- Technical Assistance
- Comprehensive Design Approach
- Chiller Initiative
- Commissioning
- Financing
- Ballast/Lamp Disposal Service

#### New Programs/Services

##### Collaborative Initiatives

- CEE Initiatives
  - Premium Efficiency Motor Initiative
  - High Efficiency Air Conditioner Initiative
- NEEP Initiatives
  - Premium Efficiency Motor Initiative
  - High Efficiency HVAC Equipment and Installation Practices Initiative
- National American Technician Excellence Program (HVAC)

##### Company-Led Initiatives

- Industrial Systems Optimization Service
- Commercial Lighting Design and Guidelines Service
- Operations and Maintenance Service
- Building Codes and Standards
- Torchiere Initiative

(Note: This list may be expanded or modified as MECo gains additional market knowledge.)

Based on MECo's prior program development experience, the Company estimates that it can take upwards to two years to fully develop a new initiative and launch it successfully in the market. Some of these initiatives will require extensive preliminary market research, while others can be started on a pilot basis in 1998 or earlier and be ramped to full-scale implementation within the first year. Also, MECo has learned that even when extensive market research has been conducted, it is only in actual implementation that it can truly identify all of the challenges and opportunities to influencing new markets. Experience in the market will be critical to the long-term effectiveness of these new initiatives; and MECo has the advantage of extensive experience in influencing energy efficiency in the

commercial and industrial markets; experience that it can now apply to the design and delivery of new initiatives and services.

The following is a description of each of the proposed new initiatives and services. Exhibit 2.8 summarizes the objectives, key short-term, two-year goals and proposed budgets for each of these initiatives.

## **A. Collaborative Initiatives**

### **1. Consortium for Energy Efficiency (CEE)**

The Company has worked with and supported CEE for more than five years. CEE has approximately 45 members, primarily utilities and environmental groups, that together are promoting a portfolio of national initiatives that are delivered through three primary approaches:

- A Common Efficiency Specifications Approach
- A Bulk Equipment Purchase Approach
- A Manufacturer Incentive Approach.

The Company expects that the influence and success of CEE's market transformation initiatives will grow as more utilities and others embrace market transformation strategies on regional and national levels, and begin to use CEE's initiatives in their own service territories. The Company has been actively represented on CEE's Board of Trustees and its program development working groups over the last several years and expects to continue this level of involvement in the organization.

The Company already uses several CEE-developed common efficiency specifications in its programs. For example, MECo:

- promotes CEE's national premium motor efficiency criteria in its own motors program through Design 2000;
- promotes HVAC standards through Design 2000 that meet or exceed the efficiency criteria established for CEE's national high efficiency commercial air conditioning initiative (HECAC).

MECo fully expects to adopt future CEE equipment standards, as they are implemented, and participate in other CEE program initiatives (such as motor systems and motor repair) now under development.

A major goal of the CEE motor initiative is to increase by 20% or more the number of vendors who sell at least 20% CEE qualifying motors.

The costs of these initiatives are predominantly for rebates that will be included in the Design 2000 budget. The remaining administrative costs of \$40,000 will be covered through a separate budget as shown in Exhibit 2.8.

## Exhibit 2.8

New C/I Market Transformation Initiatives				
Initiatives/ Services	Primary Objective	Key Goals	1998 Budget	1999 Budget
<u>Collaborative Initiatives</u> <ul style="list-style-type: none"> <li>CEE Initiatives <ul style="list-style-type: none"> <li>Premium Efficiency Motor Initiative</li> <li>High Efficiency Air Conditioner Initiative</li> </ul> </li> </ul>	Help transform the market for high efficiency motors and HVAC equipment.	Encourage other utilities in region to participate and continue full implementation of CEE's initiatives. Increase by 20% or more the number of large vendors who sell at least 20% CEE qualifying motors.	Admin. \$40,000 Rebates: covered through Design 2000	Admin. \$40,000 Rebates: covered through Design 2000
<ul style="list-style-type: none"> <li>NEEP Initiatives <ul style="list-style-type: none"> <li>Premium Efficiency Motor Initiative</li> <li>High Efficiency HVAC Equipment and Installation Practices Initiative</li> </ul> </li> </ul>	Help transform the market for high efficiency motors and HVAC equipment as well as the installation practices of HVAC technicians and reduce energy efficient equipment costs to end users by promoting demand-pull approach.	Implement installation practices pilot and harmonize rebate programs with other Mass. and regional utilities.	Admin: \$225,000 Rebates: covered through Design 2000	Admin: \$175,000 Rebates: covered through Design 2000
<ul style="list-style-type: none"> <li>North American Technician Excellence Program (HVAC)</li> </ul>	Help transform the quality of installation, operation and maintenance practices of HVAC technicians	Implement air conditioner certification exam and promote value to HVAC technicians and customers To certify 40 HVAC contractors in 1999	\$80,000	\$80,000
<u>Company-Led Initiatives</u> <ul style="list-style-type: none"> <li>Industrial System Optimization Service</li> </ul>	Help transform system optimization practices in industrial facilities	Complete 6 projects each year	\$125,000	\$125,000

<b>New C/I Market Transformation Initiatives</b>				
<b>Initiatives/ Services</b>	<b>Primary Objective</b>	<b>Key Goals</b>	<b>1998 Budget</b>	<b>1999 Budget</b>
<ul style="list-style-type: none"> <li>Commercial Lighting Design and Guidelines Service</li> </ul>	Help transform lighting design practices by introducing design guidelines and sponsoring demonstration projects.	Complete 4 to 5 demonstration sites each year and implement and disseminate design guidelines for 4 space types.	\$131,500	\$152,800
<ul style="list-style-type: none"> <li>Operations and Maintenance Service</li> </ul>	Help transform O&M practices in C/I facilities	Select 15 customers to participate in our O&M service each year; To fully develop an O&M training and certification program; Identify and sign up one school system over the two years to participate in a salary guarantee program for an energy manager. To explore the development of a building operator energy training and certification program for delivery in 1999.	\$185,000	\$185,000
<ul style="list-style-type: none"> <li>Building Codes and Standards</li> </ul>	To help advance building codes and standards to higher efficiency levels	Work with BBRS on the adoption of a new code for the C/I sector	\$20,000	\$20,000

<b>New C/I Market Transformation Initiatives</b>				
<b>Initiatives/ Services</b>	<b>Primary Objective</b>	<b>Key Goals</b>	<b>1998 Budget</b>	<b>1999 Budget</b>
<ul style="list-style-type: none"> <li>Torchiere Initiative</li> </ul>	Encourage the installation of high efficiency alternatives to Halogen Torchiere lamps.	Work with colleges and universities, public housing and, hospitality industry to reduce rapid load growth of these inefficient lighting fixtures. Anticipate replacing 5,000 lamps in 1998 and 10,000 lamps in 1999.	Admin. \$25,000 Rebates: covered through Design 2000	Admin. \$25,000 Rebates: covered through Design 2000

## **2. Northeast Energy Efficiency Partnerships, Inc. (NEEP)**

The Company was one of the original advocates for the creation of an entity to bring a regional focus and capability to the development and implementation of energy efficiency policies and programs in New England and the Mid-Atlantic States. NEEP was established to fulfill that role and MECo is an active supporter of the organization. NEEP partners with utilities, trade allies, government agencies and consumer and environmental groups, and will be coordinating efforts to increase the use of energy efficient technologies and designs for lighting, heating, cooling, industrial processes, commercial operations, and household appliances.

The Company is in the process of partnering with NEEP on two C/I initiatives. These are:

- A Premium Efficiency Motors Initiative; and
- A High Efficiency HVAC Equipment and Installation Practices Initiative.

NEEP has conducted multiple meetings for both initiatives, involving utilities and other organizations and is in the process of developing program development working groups consisting of participating utilities.

The proposed motors initiative includes three elements<sup>15</sup>:

- Incentives to vendors, customers, or both for motors meeting or exceeding CEE's efficiency criteria
- Technical Assistance to vendors, customers, or both, and
- Program Standardization, the extent to which the program and its terms appear seamless and uniform to all users, no matter where they are located in the region.

The HVAC initiative focuses on two primary elements:

- Premium Contractor Installation Service intended to improve the energy efficiency of unitary HVAC systems by improving the techniques contractors use to size, select, and install these systems.
- Improved Equipment Efficiency<sup>16</sup> focusing on harmonizing utility program standards (using CEE Tier I levels), incentives, and forms.

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<sup>15</sup>MECo currently offers incentives and technical assistance to customers.

<sup>16</sup>MECo currently offers incentives to customers



Both the motors and HVAC initiatives have rebate and administrative budgets. The rebates will be integrated into the Design 2000 budget while the administrative budget of \$225,000 in 1998, and \$175,000 in 1999 will be covered separately as shown in Exhibit 2.8.

### **3. Other Market Transformation Organizations**

The Company is considering partnering with the North American Technician Excellence (NATE) Program, a national voluntary certification program designed to develop and promote excellence in equipment technicians to raise the skill levels of small package HVAC technicians. The program is modeled after the Automotive Service Excellence (ASE) program.

Certification will be available in five areas: air conditioning, heat pumps, air distribution, gas furnaces, and oil furnaces. In each of the five areas, technicians can be certified in up to three categories: installing technician, service technician, and senior technician.

NATE is supported by a national alliance of utilities, industry, and trade allies. NATE has already developed, and is currently offering, a heat pump certification program. The first national heat pump test for technicians was scheduled for the first quarter of 1997. Similar efforts are underway for air conditioning and the other end uses. The Company's involvement would consist of marketing and promoting the certification program to customers and technicians and appears to complement the NEEP HVAC initiatives described above. The budget to support this initiative will be \$80,000 in 1998 and 1999. The Company will aim to implement NATE in 1998 and certify 40 HVAC contractors in 1999 as shown in Exhibit 2.8.

### **4. Summary**

The Company expects that its market transformation strategy will be comprised of two primary components:

- promotion of demand-pull approaches that focus on permanently changing the *supply* of energy efficient equipment in the marketplace by national and regional efforts to aggregate markets and
- promotion of installation and maintenance practices that focus on permanently changing the (*practices*) of equipment technicians in the marketplace by national and regional efforts.

## **B. Company-led Initiatives**

The Company also plans to add a number of new initiatives to its existing base of programs and services. In all cases, these initiatives are at a development effort and regionalizing these programs with involvement from other utilities will be a major objective for each. These new programs will include:

### **1. Industrial Systems Optimization Service**

This service strives to identify opportunities for waste stream reduction, increased productivity, and environmental compliance in customers' facilities to complement cost-effective energy efficiency opportunities, being pursued under our Design 2000 or Energy Initiative programs. The initial goal will be to identify customers with whom MECo is currently working or has worked with in the past on energy efficiency projects and build on that effort to pursue specific environmental and productivity improvement projects. Some of the initial targeted industries will include electronics, textile, pulp and paper, and metal finishing.

The service is being established to help deepen business awareness and support for high value energy efficiency services currently promoted by MECo. This comprehensive service will include an evaluation of the project's impact on the overall "net" savings for a customer. The resulting benefit of this program will be improved profitability, efficiency, and environmental performance of customers within the MECo territories. MECo also hopes to bring public recognition to customers who participate in industrial/utility partnerships that produce combined benefits in addition to electrical energy savings.

The initial goal of this service will be to target six customers in 1998 and 1999 and identify cost-effective system optimization opportunities. The service will include a budget for technical assistance and administration of \$125,000 for both 1998 and 1999 to help customers defray the costs of identifying opportunities (Exhibit 2.8). No financial rebates will be provided by MECo to install the appropriate equipment, but alternative funding sources for installations may be identified.

### **2. Commercial Lighting Design and Guidelines Service**

The Company sees opportunities to further advance market transformation in a number of different environments at the design stage of remodeling and renovation projects. Experience in Design 2000 suggests that while the program has been successful in advancing the use of efficient lighting measures (T8's and electronic ballasts), further efficiencies can be gained by transforming design practices to promote a systems applications approach. A systems approach highlights the benefits of integrating lighting needs that satisfy quality, productivity and space use. Accordingly,

the Company proposes to develop under the commercial lighting design initiative a number of demonstration projects that will highlight various lighting environments for different commercial space types. The objective behind these demonstrations will be to show customers, designers and contractors alternate lighting strategies that, when applied through an integrated design process, will better support the combined needs for greater energy efficiency than 'standard practice' and enhance quality, comfort and productivity goals. These demonstration projects will broaden the effort toward market transformation by addressing initial risk barriers to different lighting systems. The projects will illustrate evidence that a combination of lighting fixtures coupled with daylight dimming and occupancy control strategies through a design orientation will provide customers a better product for their lighting needs. The Company will aim to complete at least four demonstration projects in 1998.

These demonstration projects will be developed in conjunction with a series of commercial lighting guidelines targeting the lighting design community, lighting contractors and other lighting professionals. The intent of these guidelines is to revise prevailing "rules-of-thumb" to make the installation of efficient lighting systems standard behavior. By changing over time the standard practice used during remodeling or replacement in commercial buildings in Massachusetts, the Company has the opportunity to introduce more efficient design to significant amounts of floor space. MECo will develop a package of efficient lighting guidelines for specific building types and try to introduce its use widely among existing market participants. MECo intends to develop these non-binding prototype guidelines for common commercial building types and applications cooperatively with input from designers, contractors and building owners. In 1998, MECo will develop and distribute commercial lighting guidelines for four space types.

In addition under this initiative, MECo also will seek to transform standard remodeling lighting practice in properties controlled by Real Estate Investment Managers (REIM). MECo has found that the energy efficiency of leased commercial space is not an influential factor during real estate negotiations. While neither tenants nor property owners dismiss energy costs as unimportant, there is inertia within the industry created by lack of competition and the ease with which energy costs can be passed on to tenants. For most tenants, energy issues are not central to their long term lease decisions, so asset managers are not motivated on the energy carrying costs of the facilities under their care. Also, tenants often have their own unique lighting needs and requirements and don't look to REIMs or property managers for guidance. Despite these obstacles, the introduction of a package of efficient commercial lighting guidelines might

help to influence tenant investment decisions in commercially leased office space or in space controlled by third-party real estate managers.

MECo expects to work closely with the Northeast Energy Efficiency Partnerships, Inc. (NEEP) on this initiative, with the aim of making the installation of energy efficient lighting equipment and integrated lighting systems the standard practice at the time of remodeling or replacement in commercial buildings throughout the Northeast.

The budget for this initiative will be \$131,500 and \$152,800 in 1998 and 1999 respectively.

### **3. Operation and Maintenance (O&M) Service**

In the past, MECo's energy efficiency programs have focused primarily on the installation of efficient equipment and controls. While MECo attempts to assure proper operation of systems that it has recommended and helped to purchase through the Commissioning Program, the Company has not fully explored the broader set of potential efficiency improvements that might come from enhancing the operations and maintenance of installed equipment.

MECo will introduce an Operation and Maintenance Service that will help its customers identify potential problems in their building operations and also educate them as to how to best plan a maintenance schedule that fits their needs. Beginning in 1998, MECo will identify 15 customers to participate in a turnkey O&M service focusing on low/no-cost measures. It will hire an engineering consultant to help develop recommendations, design a maintenance schedule, implement the recommendations, and train the customer to use and maintain their equipment according to this plan. MECo also will develop a follow-up plan for the consultant to revisit the facility to verify that the maintenance schedule is being followed and that the low/no-cost measures are still in place and functioning as intended. MECo will pay for a percentage of the costs identifying O&M opportunities and through the custom measure approach in Energy Initiative also will pay a rebate for the energy saving improvements.

As referenced in the commissioning discussion in this plan, this service also will examine the persistence of savings at customer facilities that have participated in the commissioning service. Over the next year, MECo plans to develop and market this O&M service as described and explore the following additional activities.

- A service targeted to specific end-uses;
- Development of a baseline study;

- Energy manager salary guarantee;
- Building operator energy training and certification program.

In 1998, MECo will begin to target specific end-uses and focus on niches that are not being addressed by competitive markets. This will secure the growth of the Company O&M service and assure that it is not competing with existing service providers. MECo also proposes to work with other utilities or organizations to develop a baseline study in 1998. The information gathered from this study would allow MECo to further refine its services.

The last two items need further exploration. Often the maintenance of school facilities is poor due to budget pressure. Therefore, MECo plans to involve at least one school district in an energy manager salary guarantee program. Under this initiative, a school would contract for the services of a full-time energy manager. Experience in other jurisdictions indicates that the O&M recommendations implemented by such a manager will pay for his or her salary. If not, MECo would provide the difference -- hence the guarantee. In Oregon, where this program has been widely implemented, utilities have rarely been called upon to invoke its guarantee.

A crucial part of any successful O&M service is training for on-site customer maintenance staff. MECo will explore the idea of starting a building operator energy training and certification program, perhaps as a joint statewide or regional effort. In 1998 MECo will review what other utilities and organizations are planning in this area before advancing this idea independently. The goal will be deliver this program in 1999.

The budget for the O&M service will be \$150,000 for both 1998 and 1999 for technical studies, and an additional \$25,000 to establish a salary guarantee program in one school district. The cost of the market research study will be covered by the Evaluation budget. Finally, exploring the idea of starting a O&M training and certification program will require a budget of \$10,000 (see Exhibit 2.8). Rebates to customers for O&M improvements are included in the Energy Initiative budget.

#### **4. Building Codes and Standards**

As a matter of public policy, Massachusetts Electric supports more stringent building energy codes standards and equipment standards, within the bounds of cost-effectiveness for the consumer and the Commonwealth. The Company also recognizes that a stringent code is of no value if it is too complex to provide effective guidance to designers and builders or if code enforcement officers find it too burdensome to enforce. Therefore, MECo also supports codes that can be easily understood and administered.

MECo sees at least three public policy objectives that are served by effective energy codes. These are:

- **Financial** - In instances where utility incentives or educational programs have truly changed standard design practice or equipment specification, rebates are unnecessary because most builders would install the measure or design to the practice without any incentive. When utility-induced changes in common building practices are ratified by law or regulation, utilities can stop their financial subsidy. Additionally, where codes have helped make efficient equipment choices the most commonly produced, stocked, and specified option, the cost of efficiency to the customer often decreases significantly as a result.
- **Equity** - There is some tendency for utility rebates to flow to the largest, most sophisticated, or most progressive "high end" builders. When higher standards are required by law, then the whole market must comply and all customers benefit.
- **Level Playing Field** - Architects and engineers often say that they prefer to incorporate high efficiency measures recommended by utility energy efficiency program representatives into their designs, but owners will all too often pencil them out to reduce first costs in construction. Likewise, in a competitive bid situation, designers are reluctant to add measures that may save energy but have a higher first cost for fear of losing the bid. When high efficiency measures are required by code, these pressures are removed.

MECo sees code improvement as a constant process that can complement its programmatic efforts. That is, appropriate roles for efficiency programs are to: (1) introduce new technologies to customers; (2) mitigate the risk of these technologies by imposing quality and performance standards and assuring product reliability to customers; (3) reduce cost differentials by both providing rebates and developing market volume; and (4) familiarize designers, vendors, and installers with emerging products and tugging them into the market's supply streams.

When these efforts succeed, standard practice changes, and the code revision process steps in to ratify the change. Thus program and code go hand-in-hand, in a sense one "leapfrogging" over the other.

During the period covered by this plan MECo will:

1. Expand and enhance its relationship with the Massachusetts Board of Building Regulations and Standards, through the Company's direct participation in the BBRS's Energy Advisory Committee and through technical and financial support to the ongoing code upgrade process through the Division of Energy Resources's "Better Buildings Partnership";
2. Support national efforts to upgrade and simplify standard commercial energy code models (through participation in both ASHRAE and Multistate Code efforts);
3. Support national and regional efforts to upgrade equipment standards, through support of Department of Energy and Environmental Protection Agency efforts, as well as participation in standard-development programs developed by such organizations as ACEEE, CEE and NEEP;
4. Support regional efforts to develop common regional commercial and residential energy code standards between jurisdictions and to develop joint training and education for both code enforcers and the regulated community;
5. Facilitate and support training and education efforts for code enforcers and designers and builders in its service territory.
6. MECo also will attempt to encourage other distribution companies in the Commonwealth to join in joint efforts that incorporate some or all of these elements, as code-related activity is most logically and cost-effectively pursued on a statewide basis.

The costs for this initiative will be \$20,000 (Exhibit 2.8).

## **5. Torchieri Initiative**

Halogen torchieres were first sold in the U.S. in 1983-84. Sales have increased from a few thousand to more than 50 million annually. It is estimated that 40 million units are currently in use. This explosion in popularity has been fueled primarily by price, which is around \$15 for the least expensive models. These basic models are most popular in dormitories, apartments and homes with switched plugs instead of high quality dedicated fixtures.

The torchiere utilizes a halogen bulb, which gives off a very intense light. A halogen bulb can typically consume 300-600 watts at full brightness. It is estimated that the torchieres currently operating in the USA consume the

equivalent of 2,000 MW of power, equal to four 500 MW power plants. In addition to having high energy consumption, they also present a safety concern. Lamps can reach a temperature that can cause a fire if the lamp is tipped over or placed in close proximity to combustibles. Numerous colleges and universities have banned halogen torchieres in dormitories or are considering such action in a reaction to the energy and safety concerns.

MECo proposes to work with other utilities on a regional basis, most likely through NEEP, to develop a program to promote halogen Torchiera alternatives for C/I institutional customers who have residential applications such as student housing, public housing, and the hospitality industry. A number of manufacturers have developed, or are developing, compact fluorescent lamp alternatives to replace the halogen Torchiera. The Company will work with these manufacturers and the other utilities to: (a) reduce the rapid institutional load growth resulting from the installation of these lamps; (b) embark on a consumer safety awareness campaign; and (c) build an infrastructure that will encourage the substitution of more efficient lighting systems for torchieres.

The cost of the halogen torchiera alternative is primarily rebates which will be included in both the 1998 and 1999 Design 2000 budgets. It is anticipated that 5,000 halogen torchiera lamps will be rebated in 1998 and 10,000 in 1999. The remaining administration cost of \$25,000 will be covered through a separate budget shown in Exhibit 2.8.



## RESIDENTIAL ENERGY EFFICIENCY INITIATIVES

The Residential Energy Efficiency Initiatives build on the DPU's approval of residential program changes introduced in Docket 96-59. The residential programs have been redesigned and reorganized under four initiatives: 1) Energy Efficient Home Products, 2) In-Home Services, 3) New Home Construction and Remodeling, and 4) Consumer Education. The sections below outline the increasing reliance on market-driven and regional or national initiatives to encourage the adoption of residential energy efficiency practices. The proposal for the coordinated delivery of energy efficiency services to low-income customers is included in the In-Home Services section.

Budget information is provided for each initiative. A summary table is provided here as Exhibit 3.1.

**Exhibit 3.1**  
**Residential Initiatives Summary Budgets**

	1998	1999
I. Residential Energy Efficient Product Initiatives	\$5,482,000	\$5,634,200
A. Residential Compact Fluorescent Lightbulbs	\$3,117,600	\$2,750,700
B. Residential Luminaires	\$346,300	\$687,700
C. High Efficiency Clothes Washer	\$650,000	\$826,300
D. Home Appliances - ENERGY STAR® Retailer Program	\$1,288,700	\$1,290,200
E. Heat Pump Water Heaters	\$79,400	\$79,300
II. In-Home Services	\$6,558,500	\$5,668,900
A. Low Income Services	\$1,413,400	\$1,617,200
B. Energy Wise Services	\$5,145,100	\$4,051,700
III. Residential New Construction & Remodeling Initiatives	\$1,231,800	\$1,232,200
A. ENERGY STAR® and Energy Crafted Homes - Core Program	\$585,000	\$528,000
B. Energy Efficient Lighting Design and Appliances	\$182,800	\$240,000
C. Ground Source Heat Pumps	\$389,000	\$389,200
D. Massachusetts Code Training Support	\$75,000	\$75,000
IV. Consumer Education	\$2,163,700	\$2,164,500
A. Energy Conservation Services	\$2,112,400	\$2,113,000
B. General Educational Activities	\$51,300	\$51,500
<b>GRAND TOTAL</b>	<b>\$15,436,000</b>	<b>\$14,699,800</b>

## **I. Residential Energy Efficient Home Product Initiatives**

The Energy Efficient Home Product Initiatives address time-dependent market opportunities in the home product and appliance markets. These initiatives are designed to provide consistency in the marketing and educational messages presented to customers, while at the same time providing Massachusetts Electric with sufficient flexibility to adapt program elements to meet the particular needs of individual market segments.

Initial efforts will focus on the efficiency opportunities presented in residential lighting and major home appliances such as refrigerators, dishwashers, clothes washers, room air conditioners, and water heaters. In each case, program efforts are designed to respond to specific market barriers to create lasting market effects and ultimately to transform the individual markets. Additional existing and emerging products will be examined on an on-going basis to assess the appropriateness for inclusion in the program and for their market transformation potential.

The Company plans to support all these initiatives through participation in statewide, regional, and national partnerships. These include participation in the Northeast Energy Efficiency Partnerships (NEEP), National DOE/EPA ENERGY STAR® efforts, and collaboration with the Massachusetts investor-owned electric utilities.

### **A. Residential Compact Fluorescent Lightbulbs Initiative**

#### **1. Background**

Massachusetts Electric has been helping to transform the residential lighting market through the support of compact fluorescent lamps (CFLs) since 1991. The impact of our initiatives has been documented in each year's Performance Measurement Report and a variety of independent studies. One of these, "The Residential CFL Retrofit Market," was prepared by Shel Feldman Management Consulting, and released February 1996. The report documents that for NEES and other companies, "Their efforts have increased the penetration and saturation of CFLs in New England and stimulated manufacturers to improve their products." The report concludes, however, that "the New England CFL market seems unlikely to expand substantially in the absence of involvement by the NEES companies and other utilities."

#### **2. Program Design Summary**

Massachusetts Electric proposes to increase marketing and education efforts to broaden customer knowledge of CFLs. This aspect of the program will be operated jointly with the residential luminaires program (See Section I-B). While plans have not been finalized, Massachusetts Electric is working jointly with other Massachusetts utilities to ensure a consistent message to consumers and to reduce administrative costs.

Retail sales will be emphasized using either instant rebates or a manufacturer 'buy down' approach to reduce first costs. A 'buy down' program would provide direct incentives to manufacturers to lower their wholesale prices. A catalog or direct mail piece may be used to reach and educate additional customers. The utilities intend to work with manufacturers to introduce new qualified products to the market place and to enlist the participation of additional retailers in the program. The utilities will approach the EPA to encourage the creation of ENERGY STAR® ratings for CFLs.

### Exhibit 3.2

#### Market Barriers and Responding Program Strategies for CFL Lightbulbs

Massachusetts Electric proposes the following program design and market transformation strategy, based on the existing market barriers.

Market Barriers	Strategy Details	Strategy Rationale
Lack of consumer awareness	Develop a major product marketing and education campaign.  Coordinate marketing activities with manufacturers/other utilities.	Consumer awareness/acceptance is a key goal. According to the program's most recent process evaluation, about 37 percent of customers are still unaware of CFLs .
High first cost	Provide strategic rebates as determined by market research and market response.  Use joint-utility volume commitments to enlist/require manufacturer contributions and other concessions to lower utility and customer product costs.	The first cost of CFLs is 10 to 20 times higher than the incandescents they replace. The cost to the customer must be reduced to encourage product acceptance. Joint utility and/or manufacturer commitments can reduce rebate costs.
Lack of vendor familiarity/ program inconsistency	Work with other regional utilities to develop a joint-utility program with well documented plans and commitments.  Utilize regional circuit riders to enlist and maintain retailer participation in the program and educate them on program details, products, etc.	Inconsistent and variable product and program information provided to retailers and manufacturers, combined with program support uncertainties, reduces interest and commitments to individual efforts.
Other	Continue yearly market research to test assumptions and refine program elements as needed.	Other market barriers may be unknown and/or of misunderstood significance.

### 3. Program Goals

- Continue to build on previous program efforts and sales goals by broadly promoting compact fluorescent lamps (CFLs) and educating consumers regarding the options and benefits of efficient lighting.
- Provide momentum through the existing program initiative and structure to drive product development and common standards with regional program partners, and otherwise prepare support for lighting fixture market transformation efforts.
- Work with manufacturers, utilities, and other interested parties to develop and maintain interest in existing qualified products.
- Introduce new qualified products.

### 4. Success Metrics

- Support NEEP efforts to implement a joint utility program.
- Measure product sales.

	1998	1999
Program budget	\$3,117,600	\$2,750,700
Products installed	120,000	120,000

## B. Residential Luminaires

### 1. Background

The Company has included luminaires (hard wired, permanent lighting fixtures) as a part of its lighting program for four years. High-efficiency luminaires have several advantages over CFLs, including the permanence of savings, inexpensive replacement lamps, and improved thermal and optical performance. An estimated 1,500,000 luminaires are sold annually in Massachusetts Electric's service territory, most of which are standard incandescent luminaires.

The Company is working with other utilities through a NEEP-facilitated process to establish a multi-utility approach to support improved residential luminaires. The group has decided to support EPA's ENERGY STAR<sup>®</sup> product specifications for indoor luminaires to help define a common product and a common name. In 1997, a variety of efforts are planned to support the development of qualified products, which will be the basis for activities going forward through the five-year time period.

## 2. Program Design Summary

In conjunction with NEEP and other regional utilities, the Company will develop and operate an aggressive marketing campaign to establish ENERGY STAR® indoor luminaires as the value leader in lighting products. Program elements will work through retailers, with builders and developers in new construction, and with larger property owners to encourage sales of ENERGY STAR® luminaires. Strategies that will allow utilities to exit from this market after several years will be used to ultimately transform the market. These include customer education, product labeling, building code changes, and changes to purchasing specifications.

### Exhibit 3.3

#### Market Barriers and Responding Program Strategies for Luminaires

The Company proposes the following program design and market transformation strategy, based on the existing market barriers.

Market Barriers	Strategy Details	Strategy Rationale
Lack of quality products	Initiate joint actions with EPA and others to create a market-pull strategy to encourage manufacturers to create a new class of products.  Conduct product testing in conjunction with the Lighting Research Center, Northern Lights Utility Group and others.	Efforts must be made to ensure that products are high quality to ensure customer acceptance. Regional/national actions are required to create a sufficiently large market to interest manufacturers.
High first cost	At first, provide consumer rebates and/or manufacturer rebates to reduce price.	High first cost must be addressed directly until customers fully understand the benefits of the technology.
Lack of consumer awareness	Develop a major CFL marketing campaign in conjunction with other utilities. Develop catalogue sales/education piece. Develop detailed point-of-sale materials.	General marketing/education around compact fluorescent technology is still needed. However, for fixtures, detailed point-of-sale information and vendor support are extremely important.
Other	Conduct regional market research.	Most current market information for luminaires is national in scope.

## 3. Program Goals

- Work with NEEP to develop and implement a joint-utility program.
- Support the development of high-quality, high-efficiency residential luminaires that have operating characteristics

desired by both consumers and Massachusetts Electric, and conform to the ENERGY STAR® specifications.

- Work with manufacturers and others to make qualified products widely available to consumers at reasonable prices.
- Provide product education to consumers and retailers.

#### **4. Success Metrics**

- Establish retail, builder direct, and aggregated procurement product distribution channels.
- Engage in joint program advertising and consumer education campaigns with manufacturers, retailers, and/or NEEP utilities.
- Measure product sales.

	1998	1999
Program budget	\$346,300	\$687,700
Products installed	10,000	30,000

### **C. High-Efficiency Clothes Washers Market**

#### **1. Background**

High-efficiency clothes washers use substantially less water and energy, while washing clothes at least as well as current conventional machines. Most of the energy savings comes from the reduced consumption of heated water required for a cleaning cycle. High-efficiency models currently account for only about four percent of washer sales in Massachusetts. Major U.S. manufacturers are just entering the high-efficiency market, with Frigidaire, Maytag, and Amana/Speed Queen all having high-efficiency products available in 1997. Noticeably missing from the list of manufacturers are Whirlpool and General Electric, representing about 67 percent of the U.S. washer market.

Massachusetts Electric has been working with other utilities through a NEEP-facilitated process to establish a multi-utility approach to support high-efficiency clothes washers.

#### **2. Program Design Summary**

In conjunction with NEEP, CEE and other regional gas, electric and water utilities, Massachusetts Electric will develop and operate a regional market transformation strategy to educate consumers and support manufacturer marketing efforts to establish high-efficiency clothes washers in the market. The products have multiple consumer benefits, including improved clothes cleaning and reduced fabric wear, and substantial resource and operating

cost savings. The overall strategy is to support development of a competitive market to reduce product costs and educate customers regarding the value of the high-efficiency design. Changes to national appliance standards are a possible exit strategy as well. The final program design will be determined by all NEEP participants. This will likely include product rebates as well as educational components. The Company will provide this information to the Department when it is final.

### Exhibit 3.4

#### Market Barriers and Responding Program Strategies for Washers

Massachusetts Electric proposes the following program design and market transformation strategy, based on the existing market barriers.

Market Barriers	Strategy Details	Strategy Rationale
Lack of competitive products	Encourage early product sales to ensure that all major manufacturers enter the market, support their dealers, and market to consumers.	Several manufacturers have made a substantial financial commitment to these products. Utility investment now can help to ensure that products sell well.
High first cost	Initially, offer rebates in conjunction with manufacturers' rebates. Rely on increased competition in the marketplace to reduce costs over time. Emphasize consumer benefits.	While high-efficiency clothes washers will always be somewhat higher in cost, they offer many benefits to consumers.
Lack of consumer awareness	Support aggressive cooperative marketing and education campaigns that emphasize customer benefits.	Customers are unaware of the high-efficiency options and their benefits.
Other	Conduct market research to determine how to expand market.	Market transformation requires capturing significant market share.

### 3. Program Goals

- Create a strong near-term market for high-efficiency clothes washers in the Northeast by participating through NEEP in a joint program.
- Develop a strong consumer education campaign with NEEP.
- Increase consumer awareness of high-efficiency washers and their benefits.
- Conduct market research to evaluate results of program effectiveness.
- Support manufacturer and vendor efforts that promote the benefits of high-efficiency clothes washers.
- Encourage additional manufacturers to enter the market place.

#### 4. Success Metrics

- Support NEEP efforts by participating in a regional program
- Provide rebates to 1,300 customers who purchase high efficiency clothes washers in 1998 (scaled - no credit for less than 650 customers to full credit for 1,300)
- Develop a baseline of customer awareness of these products in 1998 in the MECo service territory

	1998	1999
Program budget	\$650,000	\$826,300
Products installed	1,750	3,450

#### D. Home Appliances - ENERGY STAR® Retailer Program

##### 1. Background

The purchase of major household appliances represents an opportunity to influence consumer purchasing decisions towards more efficient options. Although energy use is not a top criteria for most consumers when purchasing appliances, identification of efficient options is a low-cost way to encourage consumers, retailers, and manufacturers to promote more efficient options.

EPA/DOE have developed a national program to identify and support energy efficient appliances. The program works with major national retailers such as Montgomery Ward (Lechmere) and Circuit City, and plans to expand to other national chains. Refrigerators, dishwashers, and room air conditioners are currently part of the program that will expand to include other appliances over time.

##### 2. Program Design Summary

This program will develop a retailer support group who will call on retailers to explain the ENERGY STAR® Program, enlist retailer participation, train sales personnel, label products, and maintain liaison between utilities and retailer. Additional plans to work with builders and new home buyers are explained in the New Construction section (see Section III.).

This program will support the EPA/DOE ENERGY STAR® Retailer program through marketing and working with local outlets of ENERGY STAR® Retailer chains to ensure appropriate product promotion.

In order to influence the market, a fairly sizeable initial investment in educational advertising, point of purchase materials, and retailer



communications and support is needed. This investment will also help establish the ENERGY STAR® brand identity. In the first year, however, when the Company estimates fairly low appliance sales, the cost effectiveness of the program is expected to be very low. The cost effectiveness of the program will improve as sales increase as the brand identity is established. As a condition of ENERGY STAR® participation, retailers agree to release sales information to the Department of Energy. This information will allow the Company to track the effectiveness of ENERGY STAR® efforts.

### Exhibit 3.5

#### Market Barriers and Responding Program Strategies

Massachusetts Electric proposes the following program design and market transformation strategy, based on the existing market barriers.

Market Barriers	Strategy Details	Strategy Rationale
Lack of consumer awareness	Promote recognition of ENERGY STAR® branding through labeling of appliances and marketing.	Identification of efficient appliances can assist consumers in making more efficient choices.
High first cost	Provide customer education generally in support of ENERGY STAR® options, lower operating costs, and other benefits, e.g. quieter appliances.	Higher first cost is not necessarily apparent to customers for some appliances, considering the many other options and associated costs.
Lack of vendor familiarity	Work with local outlets of national chains and independent retailers to encourage the best displays and sales staff training.	Even though ENERGY STAR® has agreements with the national chains, not all local outlets participate in national initiatives.
Other	Conduct market research to identify impact of program and to determine marketing efforts.	Market transformation requires capturing significant market share.

#### 3. Program Goals

- Change the appliance purchase patterns of consumers by supporting EPA/DOE's ENERGY STAR® retailer program to identify and market ENERGY STAR® appliances.
- Encourage Massachusetts/New England utilities in their efforts to support the ENERGY STAR® retailer program.
- Develop a retailer support contractor/organization.
- Create an effective regional consumer education and marketing campaign in conjunction with EPA/DOE and retailers.

#### 4. Success Metrics

- Enroll at least 25 retailers in the program and offer sales training
- Develop a baseline of consumer awareness of ENERGY STAR® in the MEdCo service territory

	1998	1999
Program budget	\$1,288,700	\$1,290,200
Retailers recruited	30	30

### E. Heat Pump Water Heaters

#### 1. Background

During the past two years, Massachusetts Electric has installed 63 new generation residential heat pump water heaters in the homes of customers. While most customers have been satisfied with the equipment and energy savings, there have been quality and reliability problems. As part of the Boston Edison DSM Settlement Board Projects, Massachusetts Electric contributed to the development of a market transformation plan that emphasized development of a quality product. Development of that product is a national effort involving DOE, EPRI, ACEEE, and others.

#### 2. Program Design Summary

Until an improved heat pump water heater is developed, the Company does not plan to install additional products in customers' homes. The Company will continue to monitor the performance of existing heat pumps and will participate in national efforts to develop an improved product. The budget proposed will cover the costs of staff time and consultants to monitor existing equipment and to participate in planning for national market transformation efforts.

## Exhibit 3.6

### Market Barriers and Responding Program Strategies for Water Heaters

Massachusetts Electric proposes the following program design and market transformation strategy, based on the existing market barriers.

Market Barriers	Strategy Details	Strategy Rationale
Lack of a Quality Product	Work with national efforts headed by DOE and EPRI.	The New England market is too small to command the attention of major manufacturers, so joint efforts are needed.
High First Cost	Participate in a bulk procurement to lower costs when an acceptable product is available.	First cost is a critical issue in making the product attractive to customers.
New Technology	Monitor the performance of installed units to determine benefits and identify problem areas.	The technology is unproven in this application.

### 3. Program Goals

- Work with national efforts and other utilities to develop a viable heat pump water heater.
- Offer customers the opportunity to reduce the electricity needed to heat water through development of a program that supports heat pump installations.
- Monitor the performance of existing heat pump water heaters.

### 4. Success Metrics

- Commit to a national purchasing plan if developed.
- Analyze and release information concerning the performance of recent installations.

	1998	1999
Program budget	\$79,400	\$79,300
Products installed	NA	NA

## **II. In-Home Services**

The Company's In-Home Services will address existing market barriers that prevent the adoption of residential energy efficiency actions. Although the Education and Energy Efficient Product initiatives will be widely marketed to all residential customers, there still will be circumstances in which some residential customers will need additional assistance. In these cases, where the customers may be low income, live in a multifamily building, or in other ways be unable to understand and implement energy-saving actions, trained energy advisors will visit the homes and provide special assistance. These services also will be targeted to customers who have consistent high bill complaints and are unable to resolve those concerns through telephone counseling. Additionally, the continued support of the In-Home Services allows the Company to retain the capacity to ramp-up these services to deliver targeted energy efficiency to avoid distribution upgrades and to respond to short-term power shortages as the industry transitions to retail choice.

## Exhibit 3.7

### Market Barriers and Responding Program Strategies for In-Home Services

Massachusetts Electric proposes the following program design and market transformation strategy, based on the existing market barriers:

Market Barriers	Strategy Details	Strategy Rationale
Lack of consumer liquidity and reluctance to borrow	The utility company invests to replace inefficient equipment for low income customers, and provides rebates to customers with higher incomes.	Energy efficiency services are important tools for bringing bills down to manageable levels and cushioning lower income customers from the impacts of market-based pricing on affordability. All ratepayers also can benefit by minimizing unnecessary credit and collection costs by making electric bills lower and thereby more affordable.
No incentive for tenant to improve landlords' property/ No incentive for landlord to invest if tenant pays utility bill.	The utility company invests to replace inefficient equipment. Non-occupant landlords pay up to 25 percent of the cost of major equipment replacement.	The split incentive that is inherent when the utility bill payer is different from the property owner creates difficulties in capturing energy efficiency opportunities.
Low-income households generally have less education/ less awareness of cost savings energy investments.	The programs are built around an interactive educational approach and offers information designed to answer customers' questions and encourage understanding of possible energy conservation actions.	Appliance specific education and savings estimates assist customers in choosing what appliances to run and how often.
Lack of consumer awareness of efficient appliances, lighting, and building technology	Provide one-to-one education to encourage the replacement of inefficient equipment. Provide rebates or subsidized installation to ensure that all cost-effective measures are installed.	Some consumers may need additional customer specific information and counseling in order to invest in energy efficiency. Some measures may not be valued by property owners, such as air sealing or some lighting fixtures, but should be installed to ensure comprehensive installations and program cost-effectiveness.

#### A. Low Income Services

The Massachusetts Electric Low Income Services were designed to ensure that the Company fully coordinates delivery of energy efficiency services to low income customers with the appropriate community agencies. The Company also will track the participation of low income customers in all its Energy Efficiency

Initiatives. The underlying objective of all these efforts is to assist low-income consumers in managing their electric use, and thereby reducing their bills.

The Company plans to continue the Appliance Management Program (AMP), which is offered through all the Weatherization Assistance Program (WAP) agencies throughout the entire service territory and administered by Action Energy. Additionally, no later than January 1998, the Company will provide funding to the WAP agencies to supplement weatherization services in electrically-heated homes. The Company also is coordinating closely with other Massachusetts utilities and low income advocates to ensure consistency of program offerings throughout the state. In this way, the Company hopes to minimize duplication and unnecessary administrative burdens at the local agency level. If other methods of service delivery or program design ultimately appear to better meet the needs of Massachusetts Electric's low income customers, the Company will transition to that model.

### ***Appliance Management Program***

#### **1. Background**

AMP was cooperatively developed by Massachusetts Electric and the weatherization program network to address the market barriers identified below. The Company hired three WAP agencies in 1996 to test the program design and delivery. This pilot successfully served 230 customers. The first evaluation of the Pilot will be filed in July as part of the Company's Performance Measurement Report. In early 1997, a central agency structure was developed to enable Massachusetts Electric to contract with all the WAP agencies within its service territory to deliver this program to eligible customers.

The target market for AMP services is customers on Massachusetts Electric's Residential Low Income Rate ( R-2 rate) who have high electric use. Eligibility for the R-2 rate is determined by a customer's receipt of various kinds of state or federal aid, including fuel assistance. Currently, there are about 58,000 customers on the R-2 rate. Of these, about 21,000 customers are eligible for AMP, using more than 15 kWh per day, without electric heat.

#### **2. Program Design Summary**

The company has trained and provided equipment to the WAP network staff, called "Energy Managers". The purpose of the program is to identify causes of high electric use related to appliances and identify solutions to high use problems working cooperatively with customers in their homes. The Energy Managers directly install some measures, such as compact fluorescent light bulbs and low-flow showerheads, and coordinate the installation of others, such as the replacement of high use refrigerators.

About 40 percent of customers served in 1996 had refrigerators that used more than 2,000 kWh per year.

Customer education about lighting, cooking, heating, cooling, and the use of other appliances is a central part of the service. The education is done interactively to identify patterns of high use and energy education needs. Energy Managers develop a list of priority appliance management actions for customers and encourage customers to proceed with the recommended actions.

### ***Weatherization Assistance Program Funding***

Another key area of potential energy savings is electric heat. Although the Company has specifically targeted low income customers for service through the Residential Electric Space Heat Program, there still may be some low income electric heat customers who have not received weatherization services. This would include insulation, air sealing, and window treatments. Massachusetts Electric plans to fund the WAP network directly to service their clients, adding to existing state and federal weatherization funds. By January 1998, Massachusetts Electric will sign a contract with the WAP agencies to fund weatherization services for electric heat customers. We estimate about \$250,000 per year will be needed to fund this initiative. These dollars are included in the total budget number.

### ***Low Income Participation in Other Residential Energy Efficiency Initiatives***

All Residential Energy Efficiency Initiatives will include outreach activities to low income customers in their marketing plans and will collect data about participants' incomes. The Company will collect and report the number of customers with income at or below 200 percent of the federal poverty guideline. In the Energy Wise program, vendors will use a self-declaration form to gather income information. For other initiatives, we will gather information as part of the process evaluations to determine the percentage of low income customers participating.

## **3. Program Goals**

- Continue to work with all WAP agencies through a central agency to provide services to low income customers with high electric use.
- Support WAP agencies in serving 1,350 customers annually.
- Address market barriers (identified by National Consumer Law Center).
- Coordinate with statewide efforts among utilities and WAP agencies.

#### 4. Success Metrics

- Continue program contracts with WAP agencies.
- Evaluate attainment of customer goals.

	1998	1999
Program budget	\$1,413,400	\$1,617,200
Customers	1,350	1,450

### B. Energy Wise Services

#### 1. Background

The Energy Wise program provides an enhanced emphasis on education and assisting customers who are unable to implement energy saving measures due to market barriers. This program is a significant transition from existing Electric Heat only programs, the Residential Electric Space Heating and the Multifamily Retrofit programs. Those programs will end in 1997. The Energy Wise program will assist any high use customer who cannot, on their own, take steps to save electricity. Continuing to provide In-Home services allows the Company to retain a capacity to serve customers and save energy, while also testing to see what services may become available to customers through the competitive market. The program will support the energy services infrastructure and help develop the skills of those service providers and provide a transition period to market based delivery. Unlike spending and production provided by the WAP network, the Energy Wise program spending and production decrease sharply over the five year period. The program also will support the transformation of specific product markets by providing incentives and information to customers, and address high bill complaints.

#### 2. Program Design Summary

The Company will encourage the installation of electric efficiency measures in existing multifamily and smaller facilities where the customers use electric heat or have other high electric use. Cost effective measures from the Residential Space Heating Program, the Multifamily Retrofit Program, the low income Appliance Management Program, and Efficient Product Initiatives described earlier will be offered in a comprehensive package to high-use customers. By combining programs and measures, the Company plans to enhance the emphasis on education. The Energy Wise program will require customer copayments on all major measures (with the exception of air sealing) where the owner also pays the electric bill. The design of some of these rebates hinge on the NEEP Collaborative, or other joint efforts, so they may phase-in over time. Major measures include lighting



fixtures, efficient clothes washers, efficient kitchen appliances, thermostats, insulation, and air sealing.

### **3. Program Goals**

- Assist customers in implementing energy efficiency practices and realizing energy savings.
- Support the existing energy efficiency infrastructure.
- Create energy savings to assist in the transition to market-based power generation, during which time generation capacity may be in short supply.
- Gradually ramp down spending during five years to 20 percent or less of 1997 levels.

### **4. Success Metrics**

- Measure number of customers served.
- Measure lifetime energy savings.
- Measure lifetime kW reductions.

	1998	1999
Program budget	\$5,145,100	\$4,051,700
Customers	8,650	7,150

## **III. Residential New Construction and Remodeling Initiatives**

The Residential New Construction and Remodeling Initiatives address time-dependent market opportunities in new home construction and remodeling projects. The initiatives are designed to respond to specific market barriers to change current design and construction practices. Technical and financial assistance will be available for single and multifamily housing projects regardless of heating fuel type. Program efforts will focus on the efficiency opportunities presented in constructing the thermal shell of residential buildings, lighting, major home appliances, HVAC, and water heaters at the time of home construction and at the time of significant remodeling.

The Company plans to replace the Energy Crafted Homes Program with the EPA's ENERGY STAR® Homes. Efforts will target consumers, home builders, and other market actors. ENERGY STAR® levels of efficiency (30 percent better than the new Massachusetts code) will be promoted generally for all homes. The Energy Crafted Home designation will continue to be used during a one- to two-year transition period and will denote higher efficiency and advanced building sciences. Training (program, technical, and marketing) will be provided to builders and other trade allies to facilitate the implementation of the new low-rise residential energy code in Massachusetts. The Company will coordinate efforts with other Massachusetts and

New England utilities as well as state agencies to encourage similar regional initiatives.

New residential construction activity has been stable in Massachusetts for the past several years after a decline in the late 1980s. Based on company forecasts and the joint utility "New Residential Construction Baseline and Spillover Study,"<sup>17</sup> it is projected that between 6,500 and 8,000 new homes will be constructed in the Company's service area annually through the end of the decade. This projection recognizes that the building of new homes is dependent on a variety of factors including the general economy, interest rates, local conditions, and land availability.

In order to meet past energy efficiency cost effectiveness guidelines, the new construction initiatives of regional electric utilities have targeted new electric heat homes. The Company's Energy Crafted Home Program has focused on the electric heat market, with the sole exception of lighting fixture rebates for all new construction and remodeling. However, within the Company's service territory, less than 1 percent of the homes that are built use electric heat.<sup>18</sup> Consequently, on an annual basis, less than 80 homes in the Company's service territory would be built using electric heat. While the Energy Crafted Home Program has been very successful in acquiring electricity savings from this small market segment, there are several other significant areas of electric use in new homes, such as appliances and lighting, that could be addressed if non-electric heat properties could be effectively served.

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<sup>17</sup>"New Residential Construction Baseline and Spillover Study" prepared for Boston Edison, Com/Electric Company, EUA Service Corporation, New England Power Service Company, Northeast Utilities. Prepared by Strategic Utility Market Services, June 1, 1995

<sup>18</sup>Ibid, Page 55

## Exhibit 3.8

### Market Barriers and Strategies to Overcome Barriers in Residential New Construction and Remodeling

Market Barriers	Strategy Details	Strategy Rationale
Lack of consumer awareness of efficient appliances, lighting, and building technology.	Promote recognition of ENERGY STAR® branding and efficient building techniques by partnering with manufacturers, appliance dealers, builders, and utilities.	Increased awareness of the benefits of energy efficiency will influence consumers' appliance or home purchase.
High first cost	Create incentive packages to promote energy efficient technologies and products	Incentives lower a key customer barrier and give sales staff and builders a way to demonstrate customer value and utility endorsement.
Lack of understanding of the benefits of investing in energy efficiency	Work with lenders and builders, using EPA-developed materials, to better explain the value created by having a slightly higher mortgage for energy efficiency, balanced by lower energy costs over time.	The increased satisfaction and comfort levels of these homes will encourage consumers to make wise energy choices.
One time opportunity to influence product/ home choice	Use utility information to work with realtors and lenders to influence new home builders/buyers and remodelers.	Lowest costs and best technology can be incorporated in design.

#### A. ENERGY STAR® and Energy Crafted Homes — Core Program

##### 1. Background - see earlier discussion

##### 2. Program Design Summary

The ENERGY STAR® /Energy Crafted Home Program will be developed around three key aspects of the new construction and remodeling market. First, there will be a strong emphasis on marketing to and education of the housing consumer, so that consumer demand for energy efficiency is much increased. Second, the program will support builders through training and infrastructure development and support new home buyers through educational seminars to encourage the sale of energy efficient features. Third, realtors and consumers will be encouraged to use ENERGY STAR® mortgage products that offer special features for borrowers. Features

include reduced interest rates and/or improved qualifying criteria (stretch ratios) for houses that meet ENERGY STAR® qualifying standards.

ENERGY STAR® qualification requires homes to be about 30 percent better than the Council of American Building Officials' Model Energy Code 1995 (CABO MEC95), which has been recently adopted in Massachusetts. ENERGY STAR® efficiency requirements allow flexibility in meeting performance standards through trade-offs of thermal shell and HVAC energy features.

Massachusetts Electric will work with the EPA, NEEP, and other utilities, both gas and electric, to expand sponsorship of the ENERGY STAR® new construction program. Other program elements, such as lighting, appliance efficiency and ground-source heat pumps, will supplement the core program efforts. These supplemental program elements are discussed below.

### **3. Program Goals**

- Promote and support increased thermal energy efficiency in new construction. Improve and ultimately transform the standard practice of the home builder and trade-ally community to routinely incorporate thermal energy efficiency features and high-efficiency HVAC equipment.
- Create strong consumer demand for ENERGY STAR® new housing by effectively communicating the benefits and value of energy efficient housing.
- Facilitate the establishment and wide-spread use of mortgage products to finance efficiency investments and assist consumers to realize improved housing affordability from efficiency investments.

### **4. Success Metrics**

- Increase the number of participating builders in Massachusetts from the current number of 26.
- Measure the number of ENERGY STAR® rated homes.
- Measure consumer, realtor, and mortgage company awareness.
- Measure the availability and use of energy efficiency mortgage products.

	1998	1999
Program budget	\$585,000	\$528,000
Builders recruited	100	100

## **B. Energy Efficient Lighting Design and Appliance**

### **1. Background - see earlier discussion**

### **2. Program Design Summary**

When building or remodeling a home, consumers or builders typically purchase a package of new appliances. These often include dishwashers, refrigerators, clothes washers, as well as lighting fixtures and the associated lighting design. High quality, efficient appliance options also could be included in mortgage financing. The Company will provide additional financial incentives to consumers and builders for purchase of the Residential Energy Efficient Products described in Section I. Additionally, the Company will produce special materials encouraging energy efficient lighting design.

### **3. Program Goals**

- Expand the impacts of the new construction program efforts beyond the electric heat market segment.
- Increase the efficiency of lighting designs and appliance packages incorporated in new construction projects.

### **4. Success Metrics**

- Implement effective lighting and appliance program elements.
- Increase participation in these program elements.

	1998	1999
Program budget	\$182,800	\$240,000
Products installed	150 homes	500 homes

## **C. Ground-Source Heat Pumps**

### **1. Background**

GSHP technology is viewed by the DOE, the EPA, and a variety of utility, energy efficiency, and HVAC industry experts and organizations to be among the best residential space-conditioning systems. They provide superior performance, utility load and energy savings, operating cost savings for the consumer, and low CO<sub>2</sub> emission and overall environmental costs. Massachusetts Electric has supported the installation of 50 GSHPs in its service territory.

### **2. Program Design Summary**

The Company will continue existing rebates to consumers who install GSHPs as their primary heating system. The Company will also work

closely with other regional electric utilities to develop the contractor infrastructure in order to encourage more competition and lower prices.

**3. Program Goals**

- Facilitate the continued introduction of high-efficiency HVAC equipment, including ground-source heat pump (GSHP) technology and GSHP water heaters.
- Develop a significant, well-trained and competitive infrastructure.
- Create increased consumer demand and installation volume to support decreased installation costs.

**4. Success Metrics**

- Join the GSHP Consortium.
- Measure number of completed systems.

	1998	1999
Program budget	\$389,000	\$389,200
Products installed	40 systems	50 systems

**D. Massachusetts Training Code Support**

**1. Background**

The Massachusetts Board of Building Regulations and Standards (BBRS) has adopted CABO MEC 95 as the new residential building energy code effective September 1997. The new code, supported by training and implementation tools, is expected to improve code implementation and compliance. Utility assistance to the BBRS effort to introduce the new code and provide builder training can shorten the transition period to the new code, improve implementation and increase energy savings.

**2. Program Design Summary**

The Company will provide financial, technical, and in-kind support of training sessions for builders and code officials sponsored by the DOER and BBRS. The training sessions will explain the new building codes, and provide an introduction to the ENERGY STAR® Homes and other market driven energy efficiency programs. The Company will continue to coordinate with and provide assistance to the BBRS, DOER and other parties to help ensure that the residential energy code supports increased energy efficiency over time.

### 3. Program Goals

- Assist, as appropriate, with the implementation of CABO MEC 1995, Massachusetts' new low-rise residential energy code.
- Support further code upgrades as needed.
- Support training of code officials in cooperation with DOER and DOER.
- Support other builder training in cooperation with BBRS.

### 4. Success Metric

- Support all DOER sponsored training sessions in service territory.

	1998	1999
Program budget	\$75,000	\$75,000
Builder attendance	200	200

## IV. Consumer Education

All the residential initiatives show "Lack of Consumer Awareness" as a key market barrier to the implementation of residential energy efficiency measures. Providing customer information through advertising, the provision of energy efficiency literature, and phone and in-home counseling are all key aspects of the initiatives described previously. Due to the joint delivery aspect of many of the initiatives described, it was helpful to tie the educational budget for each initiative into that budget. The \$3 million in advertising/marketing for the Product Initiatives, as well as the counseling and literature production for all programs, could also be presented here as the consumer education budget. To avoid double counting expenditures, the Company here simply presents the Energy Conservation Services budget, and funding for general energy efficiency materials as part of this initiative. As needed, the Company may reallocate funding to provide here for the production of additional energy efficiency educational materials and programs if it does not easily fit into other categories

### Energy Conservation Service

The Massachusetts Energy Conservation Service (ECS) offers home energy audits and follow-up services to all residents of the state. All gas and electric utilities are required to provide this service to customers by Massachusetts statute, Chapter 465, and Regulations CMR 4.00 and 5.00. The ECS program helps homeowners, building owners, and tenants conserve energy by providing services to help make their homes and buildings more energy efficient.

Massachusetts Electric and Nantucket Electric have contracted with the Mass-Save organization to provide this service. The annual ECS surcharge for Fiscal Year 1998

was recently approved by the Department. Beginning July 1997, the program's budget is about \$2 million and will provide services for up to 13,300 customers. When Choice becomes available, the cost of this service will become part of the \$66.7 million for demand side programs and clean renewables.

The Company has reviewed the recent ECS evaluation prepared for the Division of Energy Resources. The Company agrees with the basic findings. The program has been successful for the past sixteen years. However, changes in consumer needs, consumer awareness, and the advent of utility restructuring and retail competition require that the program be greatly modified or phased out. The Company has asked to be a participant in the steering committee DOER is creating to assist in drafting legislation to reflect these new realities.

#### **1. Program Goals**

- Create kWh energy savings.
- Educate customers on energy efficiency options.
- Revise/end program to address restructured electric industry

#### **2. Success Metrics**

- Measures kWh energy savings.
- Measure number of customers served.

	1998	1999
Program budget	\$2,112,400	\$2,113,000
Customers served	13,300	13,300

#### **General Educational Activities**

The Company will continue to produce general educational materials for consumers and children, exhibit information about energy conservation at home/trade shows, and use the Company bill newsletter to provide additional information about energy efficiency. Some of these services are funded outside of the \$66.7 million, so a place holder budget of about \$51,000 is included to cover unanticipated costs.

The Company has produced the Appliance Wise Guide in English and Spanish (English version attached as Appendix C) to assist customers in taking action to cut electric appliance use. The Guide presents no-cost tips on using appliances more efficiently as well as sections on "Smart Shopping for Appliances," life-cycle appliance costs, etc. This is a key educational piece for all the In-Home Services and also is available to all customers.

The Company's Educational Services group provides videos, teaching kits, literature, and posters that explain energy efficiency to school children, as well as basic electrical safety and other topics of interest. (See Appendix D, Educational Services



Catalog) The Company continues to offer "How Many Lightbulbs Does It Take To Change A People," the energy efficiency curriculum that won the 1995 Governor's Energy Award in Energy Education. The program was developed by Massachusetts Electric and the Conservation Law Foundation and has been used in more than 100 schools throughout the NEES companies' service territory. Massachusetts Electric is active in the Massachusetts Envirothon competition for high school students, Solar Now, the National Energy Education Development Project, and the Tour de Sol sponsored by the Northeast Sustainable Energy Association.

The Company's Web Site ([www.nees.com](http://www.nees.com)) includes sections on energy conservation programs, seasonal tips for saving energy, and the Educational Services offerings.

### **Energy Smart**

The Company is also developing an energy software product that will allow consumers the opportunity to analyze both electric and other fuel usage in their homes. The Energy Smart software is scheduled to be available in late 1997. Customers will have direct access to their electric usage data through a link to the NEES website. The software is being designed to be very user friendly. The software will include energy saving tips and information about restructuring. This software product will have an electronic commerce module that could allow consumers to choose their new electric supplier as well as to shop for other services electronically. The Company feels this may be a good tool to help educate customers on supplier choice as well as on energy use in their home. It will contain some of the same information the Company offers on the website. It has the potential to be used for home automation as described in Chapter 6. This energy efficiency portion of this project is currently budgeted in the evaluation budget.

# EVALUATION

## I. Evaluation Plan and Criteria

In 96-100 the MDPU proposed biennial reporting requirements detailing Energy Efficiency activities and results. Until directives are established on the timing of these filings, the Company assumes the first performance based report of results will be filed before the filing of a more detailed plan for years three through five of the five year plan. In 96-100 the MDPU proposed companies file detailed plans for the subsequent three years of their five-year plans at least 90 days prior to the expiration of the initial two-years. Therefore, the Company proposes its first program evaluation results addressing program performance in the first year of the five year plan be submitted in July 1999.

Evaluations of the programs and new initiatives included in the first two years of the Company's energy efficiency plan will address: education and training efforts; involvement in regional and national market transformation efforts; low-income programs; and conventional evaluations of the more traditional program components. The Company also expects that the evaluation of regional programs will be done through joint utility sponsored studies and that details on the timing and scope of these regional studies will be determined after regional program designs are finalized.

The Company proposes the following evaluation criteria for traditional, educational, and regional program components:

- All significant program components evaluated at least once during the two year filing cycle.
- Regional efforts evaluated on a regional basis, where appropriate. (The Company assumes regional studies will be jointly sponsored by participating utilities. Also, measurement criteria other than kWh savings, such as market impacts, technology saturation, etc. may be appropriate measures of regional program impacts.)
- Initial process evaluations of new educational, training, and customer service efforts initiated within one year of implementation.
- Programs where tracked participation and savings vary significantly from planning estimates in two consecutive years will be evaluated.
- Traditional programs and program components evaluated once during the two year filing cycle.
- Savings estimates and performance metrics required for incentive calculations meet MDPU accuracy standards.

The evaluation plan addressing the first two years of the Company's five year efficiency plan, based on the above criteria includes:

- Regional, joint utility, process evaluations of CEE and NEEP C&I partnership ventures including C&I Premium Efficiency Motor and High Efficiency HVAC initiatives and National American Technician Excellence Program conducted in 1999.
- Tightly scoped process evaluations of new Company based C&I programs, services, and training addressing Industrial Systems Optimization Service, Commercial Lighting Design Service, Commercial Lighting Guidelines, O&M Service, and Building Codes and Standards. These evaluations will be conducted throughout 1998 and 1999 at points in time and program development when feedback on program performance will be most useful to program managers.
- Process evaluation of residential Low Income Initiatives in early 1999 to assess the effectiveness of the program in reaching all segments of the low income population.
- Regional, joint utility, impact and process evaluations of the major elements of the residential Energy Efficient Product Initiatives program, including NEEP partnership initiatives, and the New Construction Program conducted in 1999.
- A study in 1999 of the effectiveness of promoting ENERGY STAR® products.
- Impact and process evaluation of the Company's In-Home Services Energy Wise program. Process evaluation conducted in late 1998. Impact evaluation conducted in 1999.
- Customer awareness studies of residential Consumer Education and Information Initiatives conducted throughout 1998 and 1999 upon completion of individual marketing campaigns.
- Baseline studies to assess customer awareness of energy efficient clothes washers and ENERGY STAR®.
- Market and baseline studies, where appropriate, to support regional and national initiatives
- Studies to assess and track indicators of market effects for regional initiatives

Current MDPU settlement agreements include filing an evaluation of the Company's 1997 DSM program in July 1998. The evaluation of the 1997 programs will cover the traditional Energy Initiative, Design 2000, and Small C&I program elements being carried over to the five year plan. The Company proposes that no additional evaluation of these traditional program elements be conducted in 1999. In 2000, evaluations of the more traditional program elements will be conducted with particular emphasis on their evolution to market transformation programs.

Evaluation plans for years three through five of the five year plan will be included in the Company's 1999 filing of detailed plans for those years.

The proposed annual evaluation, research, and regulatory support budget of \$2.9 million in 1998, dropping to \$2.5 million in years 1999 through 2002, covers more than traditional DSM program evaluations. Only the cost of studies directly related to evaluating the performance of implemented energy efficiency programs are included in the benefit/cost calculations shown in Chapter I; the annual cost of these studies, including staff costs, is estimated to be \$1.5 M in 1998 and 1999. In addition to traditional impact and process evaluations of ongoing programs, the total budget covers the cost of customer awareness studies to assess the impact of educational program efforts; market transformation studies to assess changes in market factors; planning studies (these include baseline and market barrier studies); collaborative consultants; participation in relevant national studies such as EPRI tailored collaborative projects; funding for support of regional and national DSM organizations (examples are NEEP and CEE); R&D projects to assess the viability of potential program measures, software and services; miscellaneous expenses related to fulfilling regulatory related commitments; and staff costs.

## METERING/CONTROLS

Massachusetts Electric is evaluating a number of advanced metering options to provide the Company and its customers with additional information to assist them in managing their energy consumption and to give the Company more control over its distribution system. The Company is considering for 1998 and 1999 the installation of a system that provides the ability to communicate with customers' energy meters, and also bidirectionally with remote terminal units (RTUs) installed on distribution feeders, to demonstrate and provide energy efficiency benefits. The estimated cost of a demonstration system, including planning, engineering, installation, operation, and evaluation is \$2,000,000 over the two years. The results of this demonstration system will be used by the Company to formulate its plans for the remaining three years of its five year plan.

A system capable of remotely communicating with both meters and RTUs provides the ability to collect meter and feeder data, in a cost effective manner, on a much more frequent basis than with manual methods. In addition, a communication system provides the ability to remotely configure common residential meters to act like a demand or time-of-use meter, or an interval data recorder. Energy efficiency benefits that result from such a system are outlined below:

### I. Metering

Systems with the ability to communicate with energy meters on a frequent basis provide the following opportunities for increasing the level of energy efficiency benefits.

- A. Energy efficiency data collection at lower cost, with greater flexibility. Communication of metered data can provide data acquisition equal to or better than today's methods, from simpler, lower cost meters. For instance, some systems allow the same residential common meter used to obtain basic kWh consumption to be remotely configured as an interval data recorder to collect data as frequently as every five minutes. Special meters or recorders would no longer have to be installed and removed at specific customer locations. Any common meter can become a load survey meter.
- B. Potentially more rate options available to a larger customer base. Any meter that can communicate to a central controller can be remotely configured as a time-of-use meter. The ability to remotely configure meters would allow new rate structures to be designed and for customers to take advantage of them without the need to change to a more expensive meter. New rates could be designed to encourage customers to reduce demand and energy consumption during peak times, and be implemented quickly at low cost.

- C. Verifiable load management applications. Current energy efficiency methods cannot verify that an air conditioner, water heater, or other such device has been turned off on command. Meter communications would provide the ability to verify a load reduction following commands to turn off these devices.
- D. Better customer data. A system that remotely collects meter data, at least on a daily basis, could provide numerous customer service and potential energy efficiency benefits. For instance, access to this data would allow Customer Service representatives to help customers identify the source of high bills and high energy use. For example, daily data could be used to identify abnormally high energy use on a particular day or during a particular period. This information, in turn, could help the customer identify the reason for the increased energy use, such as filling a pool or leaving an appliance on.

In addition, daily data could be used to identify customers with abnormally high use and demand. Once identified, these customers could be targeted for various energy efficiency programs, such as insulation and lighting.

## **II. Lower System Losses**

System losses can be reduced by using the same communications infrastructure used for remote metering to support distribution automation. A distribution automation system would provide much better information about the state of the distribution system and individual feeder performance than is currently available. Having better, up-to-date information would allow individual distribution feeders to be “fine tuned” to reduce losses. This could be accomplished by:

- A. Remotely switching capacitor banks to improve the power factor on the feeder. Improving a feeder’s power factor reduces the current flowing through the feeder, which results in lower feeder losses.

Remotely coordinating the switching of capacitor banks and other voltage regulating equipment on feeders to control overall system voltage. Optimizing feeder voltage profiles results in both loss and load reduction as well as capital savings. The system optimization only can occur with real time information about loads at the customer level.

- B. Remotely switching load between feeders. Having up-to-date, real-time, feeder information, coupled with the ability to remotely operate feeder ties and other feeder switching devices, may allow load to be transferred from heavily loaded feeders to feeders with less load, in such a way that the total losses for both feeders is reduced.

- C. Targeting feeder loss reduction projects. The more detailed feeder load data that a distribution automation system could provide likely would allow engineers to identify cost justified loss reduction projects such as improved feeder balancing.
- D. Better transformer management. The customer load data that a distribution automation system could provide should allow engineers to better manage distribution transformer loading, which may result in lower transformer losses and fewer transformer failures.

### **III. Home Automation**

The same communications infrastructure used for remote metering can be used to communicate with home automation devices such as smart thermostats. A smart thermostat controls temperatures based on energy cost data, and results in lower demand during peak periods. In general, home automation devices enable customers to automatically and remotely control their usage in response to variable energy pricing, thus providing customers with more control over their energy usage and costs, which should result in lower peak demands. The Energy Smart software discussed in Chapter 3 may be used to support home automation.

# INTERRUPTIBLE RATES AND HOME ENERGY MANAGEMENT

## I. Cooperative Interruptible Service (CIS)

The CIS program is a load management program that benefits both the Company and the customer. CIS customers may be asked to reduce their loads to a predetermined level during interruption periods. These are times when supply or transmission resources are insufficient to meet anticipated load demand plus operating reserve requirements. These high demand periods typically occur when the weather is very hot or cold. The execution of the load reduction is under the complete control of the participating customer. When an interruption is directed by the dispatching authority, the customer is expected to reduce load to a designated firm power level. A monthly credit is paid to the customer for the value received by the Company for the availability of interruptible load.

The CIS program is available to commercial and industrial customers who can designate as Nominal Interruptible Load the larger of either 200 kilowatts or 20 percent of their Nominal Peak Period Load. There are several program options available. The customer can choose the different maximum interruptions per year, maximum continuous interruption hours per day, and the minimum period of notification. There is also a choice available for the type of incentive process. Choices offer performance-based incentives or penalty-based incentives. The customer can choose the options that best meets their operations needs. The credit paid depends upon the value derived by the company.

The CIS program is no longer available. Customers who are currently participating may continue to participate until the program terminates in the year 2000.

The 81 Massachusetts Electric Company customers have designated Nominal Interruptible Load of 66,320 kilowatts available in the summer power period and 65,884 kilowatts in the winter. The CIS budget for 1998 and 1999 is \$3.9 million. The tariff sheets for CIS are included in Appendix E.

Mass. Electric will investigate the feasibility of selling its rights to interrupt customer load to competitive suppliers or other entities. Mass. Electric will conduct this investigation once retail access has been implemented, as Mass. Electric believes a higher value will be obtained once the new wholesale and retail markets have been established and market players are better able to assess the value of such rights. If found to be feasible, Mass. Electric will develop an implementation strategy for transferring the rights to suppliers in exchange for their market value. The net proceeds from the potential sale of these credits may be reallocated across the energy efficiency program budgets shown in Chapter 8.



## **II. Home Energy Management**

The Home Energy Management Program provides direct control of residential water heaters, central air conditioners, and pool pumps to shift load to off-peak hours. A device is installed in the customers' homes, which temporarily shuts off the lower of two heating elements in the water heater for up to 16 hours per day. Air conditioning compressors and pool pump motors are frequently cycled on and off. This program generally does not save energy, but rather shifts energy use to off peak hours. Participating customers receive a credit on their electric bill for allowing the Company to control their appliances. More than 23,000 Massachusetts Electric customers are currently participating in the HEM program.

The HEM program was introduced in 1989 and was included as part of the package of residential energy efficiency programs. In 1994, the budget for the program was moved to the New England Power Company. As part of the "Consumers First" settlement approved by the Department, the budget for the HEM program will move back to Massachusetts Electric. The annual budget of \$581,000 provides for the continued maintenance of the existing system, which includes the continuation of radio leases to send the control signal and computer maintenance charges.

The Company has agreed to continue providing controlled water heating credits to customers through the year 2000 in the "Consumers First" settlement. However, it is not clear at this time if the Company should continue to provide load control services to residential customers. The Company will continue to maintain the existing HEM system, and control customers daily and seasonally as appropriate. The Company will notify the Commission of any proposed changes to the program as more information is available.

# TARGETED DEMAND SIDE MANAGEMENT

## I. Introduction

Targeted demand side management (TDSM) involves implementation of energy efficiency in a specific geographic area as a means of providing sufficient load relief to defer planned capital investments in certain types of distribution projects. Since 1994 Massachusetts Electric Company has conducted pilot investigations of targeted demand side management and distributed generation (also known as DG, which uses dispersed, relatively small and often mobile generation resources sited in the distribution system for peak clipping to achieve the same deferral objectives). The Company has gained significant experience in both the data collection and implementation components of a TDSM/DG program. The Company is committed to expansion of TDSM beyond the pilot phase and will be pursuing Targeted DSM and Distributed Generation opportunities as part of its five-year plan for energy efficiency.

The Company's prior activities in TDSM/DG investigations have been described in a series of progress reports filed in 1995 and 1996. Our most significant accomplishments are:

- Demonstrating to Company distribution planning personnel that the benefits of TDSM/DG are realizable and concrete and education on how to identify viable opportunities;
- Develop candidate project screening criteria;
- Conducting Company-wide screening of anticipated distribution projects for deferral candidates;
- Developing analytical framework for studying loads and options at TDSM candidate sites;
- Piloting local metering, customer dispatch, and data analysis techniques.

In addition to building upon the experience already gained and the DPU support for TDSM/DG (indicated in its restructuring decisions) as a reasonable option to defer distribution system upgrades in a restructured electric utility environment, the Company is interested in this program element for two reasons. First, in a restructured electric utility environment, TDSM and utility-controlled peak clipping DG will directly benefit the distribution company through capital investment deferral and maximize the return on prior investments (asset management). Second, while market transformation is not an objective of TDSM/DG -- unlike other elements of this five-year plan -- its local area-specific focus is complementary to most any energy efficiency program, be it market transformation focused or otherwise.

It should be noted that there are a number of uncertainties associated with planning of future TDSM/DG, such as distribution utility rate design, future regulatory requirements (e.g., performance-based rates), changes in distribution planning methods, and improved distribution automation. What all these factors have in

common is that they are either new or historically have been unimportant in energy efficiency planning. It is difficult to predict what impact they may have on this plan, which has been developed from a energy efficiency perspective. These factors may affect the Company's circumstances to the point where significant changes in TDSM/DG assumptions and objectives will be warranted, more so than with other areas of this plan.

## **II. Plan Components**

The Company's plans for the next five years center on continuing to build on the successes that have been achieved. The TDSM/DG plan has four key components: education, identification of opportunities, implementation, and measurement. Each one of these components is outlined below.

### **A. Education**

TDSM/DG planning represents an enhancement to historical distribution planning practices. Therefore, key to the Company's plan is further demonstration of successful TDSM/DG projects and methods to district planning personnel. To promote acceptance, the plan calls for pursuing projects in each district, given suitable opportunities, to familiarize local district planning and marketing personnel with the details of implementing TDSM/DG projects.

Joint meetings of district personnel once or twice a year are also planned. At these meeting we will share experiences about ongoing projects. We also will use these meeting as a forum to discuss subjects where changes in distribution planning methods -- such as better metering, improved local area load forecasting, or changed planning criteria -- may impact TDSM/DG planning.

### **B. Identification**

Projects will be identified through one of two paths: screening and nomination from the districts. The Company will conduct annual screening of projects in the distribution budget and apply its three-part screen to identify possible candidates. Typically the best candidates are distribution projects that are needed in two to five years, are driven by the need to meet load growth rather than reliability considerations, and are budgeted to cost in excess of \$250,000. Alternatively, as district planning and marketing personnel gain experience and confidence with TDSM/DG, they may identify projects as they become aware of them. For each candidate project (which passes the screen or which is nominated), local area-specific customer demographic and end-use characteristics (such as peak load conditions, peak load frequency and duration, as well as historic energy efficiency program participation and remaining energy efficiency potential for the identified customer base) will be collected and analyzed. This information will help in identifying the feasibility of going forward with a TDSM/DG project.

### **C. Implementation**

Once a given candidate project is identified, the energy efficiency marketed and delivered may be existing system-level energy efficiency programs (outlined in Chapters 2 and 3 in this report), or be designed to the specific characteristics of the local customer base. Targeted demand side management delivery may be achieved through intensified marketing efforts and/or an increased incentive level. Some incremental cost may be borne for this targeting. This additional cost is justified on the basis that the implementation of energy efficiency in the target area has greater value than a random location because of the additional value of deferring the investment in capital and fuller utilization of the existing distribution system.

If distributed generation is identified as the best option for a candidate area, implementation would involve the construction and dispatch of the generation. This has a very different cost structure than energy efficiency programs. However, as with energy efficiency, to the extent possible, Massachusetts Electric could work with other parties, including the customers in the area, to leverage the incremental costs of generation to the Company.

### **D. Measurement**

The only viable indication of successful deferral is accurate measurement of actual localized load reduction. At the outset of each project, all parties must agree to a specific load target to be achieved under specified conditions (based on current loads and predicted growth forecast) and identify a decision date for proceeding with the planned distribution upgrade. Measurement of load reduction achieved through TDSM/DG must be done prior to the construction commitment date to demonstrate to the involved distribution planners and engineers that the target has been achieved and that the planned distribution upgrade may therefore be deferred for one year or more.

Measurement typically requires the installation of remote metering on the target distribution system components (substations or feeders) and a dedicated phone line to transmit data out to analysts and planners. Data collected must be analyzed to identify whether the target has been achieved. Data will be adjusted as necessary for weather conditions and other major fluctuations, such as production variations at key customer facilities.

### **E. Other**

The Company recognizes that to achieve optimum implementation of TDSM/DG, some new issues will have to be addressed. Included among these are the possible development of local interruptible rate plans to supplement the state- and system-wide interruptible programs that currently exist, and the relationship between the distribution company and power generators with respect to the output of distributed generation. Detailing a program for these issues is beyond the scope of this plan.

### **III. Goals and Budget**

The specific level of funding for TDSM and DG projects will be contingent on the specifics of projects that are not yet identified. Given the Company's experience with recent screening, it is expected that up to 10 projects will pass the screen annually. Some of these may prove to be infeasible for TDSM for various reasons. For example, further investigation into load growth in a target area may indicate a growth rate faster than initially projected, which would accelerate the need for the distribution upgrade, that in turn would leave no time to pursue TDSM options. Implementation of actual TDSM/DG projects is expected to ramp up with increased experience. By the end of the five-year planning horizon, approximately half of the investigations are expected to lead to TDSM/DG implementation initiatives.

The load target will vary with each project as well but may be estimated at between 150 and 1000 kW. For budget purposes, an average of 500 kW is assumed. The incremental cost of TDSM also varies based on the specific measures appropriate for the local customer and load profile; the average incremental cost is estimated at \$120/kW-yr. This would give an average cost-per-implemented-project of \$60,000. There will be additional costs of \$50,000 to \$100,000 annually for planning and analysis by outside consultants, depending on the number of projects screened and how far toward implementation of TDSM/DG they progress. This will help the Company overcome the unique circumstances that are associated with each project.

The Company expects to leverage existing energy efficiency programs to the fullest extent possible in implementing targeted demand side management projects. The Company also will investigate alternative means of financing -- such as EPRI Tailored Collaboration, third-party implementation, or special arrangements under the Company financing program -- to control the incremental TDSM costs (in excess of the standard energy efficiency program implementation costs). If Distributed Generation is the identified option for a target area, the Company will explore options of cost-sharing with other interested parties.

At least in the early years of the plan, the costs for this initiative will be primarily incurred by the specific energy efficiency programs that are applied to each project. In the later years of the five-year planning horizon and as successful deferrals are achieved, it is expected that incremental funding will be obtained from the distribution capital budget, as that is where project deferral savings would be accrued.

## BUDGETS

The Company's Offer of Settlement in DPU 96-25 established an annual budget for energy efficiency programs and clean renewables of \$66.7 million. Exhibit 8.1 shows the energy efficiency budgets associated with the settlement for 1998 through 2002. The budget is separated into three major components including Residential Programs, Commercial/Industrial Programs and Other Programs including Interruptible Rate Credits, and Home Energy Management (HEM) the incentive earned from the Residential and C/I programs, program evaluation costs and metering and control costs. A detailed budget is provided showing a separate budget for each initiative for 1998 (Exhibit 8.2) and 1999 (Exhibit 8.3). For 2000 through 2002, a preliminary summary budget is provided showing budgets at the individual component level as opposed to the initiative level. MECo will provide detailed budgets for 2000 through 2002 when it files an update to this plan in the fall 1999.

The initiatives supported by these budgets are described in Chapters 2 through 7. Under the C/I Programs, the New Market Transformation Initiatives refers to the initiatives described in Chapter 2, Section V (pages 43 through 56). These initiatives complement the market transformation that occurs through Design 2000, Energy Initiative and Small C/I as described in Chapter 2, Section IV.

During the first two years of this plan, MECo requests the authority to adjust and supplement the Initiatives described in the plan as it gains more experience with them. These changes could include but are not limited to:

- shifting dollars between programs or initiatives within the same component
- adding or removing energy efficiency measures to a particular program or initiative
- adjusting terms and conditions of an initiative

MECo also proposes that it will notify the Department and all parties to MDPU 96-100 of any new market transformation initiatives it proposes in the future, any proposed transfer of dollars between budget components or other such substantive changes. Within two weeks of the filing, any party may then petition the Department for a hearing on the adjustment or supplement. If any such party so petitions, within 30 days of the filings, the Department will either approve the change or notify MECo of the need for a more in-depth review. Otherwise, the change will be deemed approved unless the Department notifies MECo of the need for a more in-depth review within thirty days of the filing.

# **Chapter 1: Policy Framework**

# **Chapter 3: Residential Energy Efficiency Initiatives**



## **Chapter 2: Commercial/Industrial Energy Efficiency Initiatives**

# **Chapter 4: Evaluation**

# **Chapter 6: Interruptible Rates and Home Energy Management**

# **Chapter 5: Metering/Controls**

# **Chapter 7: Targeted Demand Side Management**

# **Chapter 8: Budgets**

# **Appendix A: Proposal on Avoided Generation Component from DOER**

## **Appendix B: Description of the Accelerated Application Process**



## **Appendix C: Appliance Wise Guide**

# **Appendix D: Educational Services Catalog**

## **Appendix E: Cooperative Interruptible Service Tariffs**